DOCUMENT RESUME

ED 210 526 CE 030 818

AUTHOR Sheffield, Cynthia L.; Farrington, William S.
TITLE Extension Energy Tips: Telecassette Energy Information System. A Pilot Study.
INSTITUTION Florida Univ., Gainesville. Inst. of Food and Agricultural Sciences.; Sarasota County Cooperative Extension Service, Fla.
PUB DATE [81]
NOTE 113p.

EDRS PRICE MF01/PC05 Plus Postage.
DESCRIPTORS Administrator Attitudes; Conservation Education; County Programs; *Energy Conservation; *Extension Education; *Information Dissemination; Information Systems; *Instructional Materials; Literature Reviews; Magnetic Tape Cassettes; Material Development; Pilot Projects; Program Development; Program Effectiveness; State Surveys; *Telephone Communications Systems; *User Satisfaction (Information)
IDENTIFIERS *Energy Extension Tips Service; Florida (Sarasota County); University of Florida

ABSTRACT

The University of Florida Agricultural and Extension Education Department and the Sarasota County Cooperative Extension Service collaborated to conduct a pilot project utilizing a telecassette system to disseminate energy information. A statewide survey was administered to Florida county extension directors to identify the most frequently asked energy questions. After analyzing the survey results and selecting 100 topics for use in the project, researchers developed scripts and taped messages ranging in length from 15 seconds to 3 minutes and 45 seconds. These were incorporated into a telecassette Energy Extension Tips Service that was made available through the Sarasota County Extension office. In order to evaluate the system, project-developed evaluation surveys were administered to users of the system and to a random sample of the general public of Sarasota County. The surveys revealed the following facts: 80 percent of the general public contacted were unaware of the existence of the extension energy tips service and 98 percent of the users were very satisfied with the quality of the service and said they would use it again. Included in appendixes are references used to develop the scripts, the telecassette program management system, and the tape scripts. (MN)

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EXTENSION ENERGY TIPS

TELECASSETTE ENERGY INFORMATION SYSTEM A PILOT STUDY

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EXTENSION ENERGY TIPS :
TELECASSETTE ENERGY INFORMATION SYSTEM
A PILOT STUDY

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EXTENSION ENERGY TIPS :
TELECASSETTE ENERGY INFORMATION SYSTEM
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INTRODUCTION

At this time energy awarness and conservation are primary concerns of the general public. As a result, the Cooperative Extension Serivce has been charged by the U.S. Department of Energy with the added responsiblity of serving as County Energy Information Centers(CEIC).

Another aspect of the Cooperative Extension Services new thrust into the area of energy is added responsibility on the part of individual agents. Extension agents are responsible for implenting and incorporating energy programs into their current on going programs as well as disseminating CEIC materials. To accomplish this new assignment, without detrement to their established programs, the county extension personnel need reliable energy and time efficient systems of information dissemination.

In an effort to answer to this need, the University of Florida Agricultural and Extension Education Department in conjunction with the Sarasota County Cooperative Extension Serivce conducted a pilot study utilizing a telecassette system to disseminate energy information. This system was used as a supplement to the methods of information dissemination already employed by the Sarasota County Extension personnel.

It was thought that such a system would enable county extension personnel to serve a greater number of energy clients per man-hour on the job than some other methods now employed, thus relieving some of the work load of the county extension personnel

REVIEW OF TELECOMMUNICATIONS INSTALLATIONS

New York Institute of Technology Study

In a study conducted by the New York Institute of Technology (NYIT),"A Hotline for Energy Information",

similar to the system proposed in this study, proved successful. The NYIT study was conducted in a primarily

urban/suburban tricounty area. At the end of a one and a half year pilot study the NYIT Hotline had received 3,306 calls and answered 5,953 questions. (Spak, et. al. 1978)

The NYIT study showed that more than half of the homeowners who used the service spent an average of $1,280.00 each to retrofit their homes on the basis of information learned. The overall cost-to-savings ratio was greater than 1:11. A follow-up survey indicated that a large majority of all users believed the NYIT advisory service was valuable, reliable and unique as a comprehensive, easily accessable source of information and technical assistance on energy conservation and alternative energy systems. (Spak, et. al. 1978)

Clark University System

A similar Hotline system was developed and operated at Clark University in Worchester, Massachussetts during the years 1977 through 1979. This system was operated as a pilot study which terminated in mid-1979. The Clark University Hotline was used as a vehicle to establish the most frequently asked energy related questions and answers. Therefore, when the Clark University system began operation there were no prepared questions and answers. During the first few months operators used any available brochures and pamphlets to answer the questions they received. (Delaney, 1980)

The Clark University Energy Hotline consisted of a toll-free telephone line, which was publicized throughout the area. The system was operated by students from Clark Univerisity, who worked on a part-time basis for salary. When a client called with a question, the operator would answer the question if possible. Then both the question and answer were recorded. If the operator could not find an answer to the question, the clients question, name and telephone number were recorded and the client was told that they would be contacted with an answer within two or three working days. The Clark University system operated 24 hours a day, six days a week. The end result of the Clark University Energy Hotline study was a compilation of the most commonly asked energy questions and answers. (Delaney, 1980)

North Carolina : Extension Teletip System

North Carolina'a work in the area of telecommunications began in 1974 based on a dial-access system pioneered by the University of Wisconsin. (Christensen,1979)

Within four years the North Carolina effort moved from a 10-week trial run in one county to a year-round, state-wide toll free information data bank. The number of pieces of information increased from 40 tapes, dealing with food conservation, to 781 tapes on synergy, home repair and maintenance, gardening, lawn care, pest control, and family resource management. (Christensen,1979)

North Carolina's state-wide Teletip system became operational March 20, 1978 at North Carolina State University in Raleigh. (Christensen, 1979)

Extension Teletip started with four incoming WATS lines. Two lines were full-time lines and two lines were measured WATS lines. Hardware purchased included two Tapecaster cartridge reproducer-players and eight Tapecaster cartridge players. Continuous-loop tapes were used so each message would not have to be re-cued by the operators. (Christensen, 1979)

Teletip's equipment was maintained by a full-time engineer, employed by the North Carolina Agricutural Extension Service. The promotion efforts for the system included the production of about 560,000 brochures,some of which were personalized to the individual county. In addition county extension staff members used the local newspapers, radio, television and community contacts to promote the system. (Christensen, 1979)

Additional promotional support was provided by the state information staff. Their efforts included news releases, radio spots, television promotions, and magazine articles. Two portable exhibits were also designed and offered to county staff members for use at local events and were set up at some state-wide activities.(Christensen, 1979)

The Extension Teletip operation had one staff person who works 39 hours a week. Three part-time operators covered the additonal time needed to keep Teletip operational 69 hours a week. (Christensen, 1979)

The estimated cost of the system for the first year averaged 74 cents per call. In addition, the North Carolina Agricultural Extension Service received more acclaim for the Teletip program than perhaps any other program initated.(Christensen, 1979)

· North Carolina State Universtiy Chancellor Joab Thomas summed Teletip up this way: "This is one of the more effective and innovative public service programs that I have seen in a long time. It hits dead center on the responsibility of this institution to provide public service. It's a supreme example of the Extension Service moving into the last quarter of the 20th century. (Christensen, 1979)

Dane County : Garden Dial Access System

The Dane County University of Wisconsin Extension Office in Madison, initiated a telephone-tape system (Garden Dial Access) dealing with home horticulture questions. This system began operation in spring of 1974. The Wisconsin system consists of a library of tapes available to the public via the telephone. The taped messages range in length from two to four minutes. The system operates 24 hours per day, seven days a week. This system covers topics including house plants, flowers, vegetables, fruit, lawns, ornamentals and landscaping. (University of Wisconsin Extension Communication Programs, 1976)

The Wisconsin system operates very much like the North Carolina system. The client calls in and requests a tape by number,when the tape is finished, the call is automatically disconnected. If the client wants to hear more than one tape they must call the system for each tape desired. (University of Wisconsin Extension Communication Programs, 1976)

During 1975 a telephone survey was conducted to evaluate the success of the Dane County Home and Garden Dail Access System. The results of the telephone survey indicated that:

- 95% of the callers listened to the entire tape.
- 94% of the callers were satisfied with the tape information service.
- 92% of the callers said the taped message was easy to understand.
- 84% of the callers said they shared the information with one or more people.
- Close to 70% of the callers said the tape message gave them the information they wanted.
- 64% of the callers were in the 20 to 40 years of age group.

(University of Wisconsin Extension Communication Programs,1976)

After two years of successful operation the Dane County system was expanded in 1976 to include four additional counties (Rock, La Crosse, Fond du lac, and Sheboygan) each was provided with a toll free Dial Access number. (University of Wisconsin Extension Communication Programs, 1976)

Pierce County Library System

Another example of this type of system is the Pierce County Library program in Tacoma, Washington, which began in 1975. This system provided educational, informational and entertainament type programs. The favorite length of program was 10-15 minutes. The programs were changed weekly.(Fuller,1979)

The orginal equipmnment for this program was a gift from a private foundation. The library district's responsibility was to staff, maintain and operate the system to best serve the public needs. (Fuller, 1979).

The initial system cost over $80,000. In 1977, the system was modified and expanded. This change was supported through a $50,000 grant. (Fuller, 1979)

The library now has 8 telephone lines dedicated to this programming, eight 4-track reel-to-reel tape decks and a weekly schedule of 26 programs. The equipment is automatic and operates 24 hours a day, 7 days a week. (Fuller,1979)

The main problem with this system was that it could only be accessed by touchtone telephones. This included only about 38% of the households in the Pierce County area at the time of this study. (Fuller,1979)

Tel-Law of Orange County System

Tel-Law of Orange County,California, is one of the most successful dial-access legal information systems in the United States. It receives around 5000 calls per month. (Vallens, 1979)

Tel-Law of Orange County,CA., offers 89 tapes on legal subjects, accessable 24 hours a day. The system has ten phone lines into a professional answering service. The operation and development costs of this program were approximately $25,640. (Vallens, 1979)

The Legal Aid Society and the Orange County Bar Association indicated that the Tel-Law system is the most cost-effective method of information distribution that they have ever attempted. (Vallens, 1979)

Dial-A-Mini-Message System

The Dial-A-Mini-Message system started at the University of Wisconsin in February 1976. This project's beginning budget was around $4000.00. The budget included rent for the equipment, cost of extra telephone lines, printing costs for brochures, and the production of 200 recorded messages. The system was originally staffed by the office receptionist,which proved impractical. The system began with operational hours of 8:00am to 4:30pm Monday thru Friday.(Charmicheal,1979)

By 1979 the budget had grown to $14,000.00. The system had expanded to include 700 taped messages. In addition the hours of operation had been expanded four hours each evening Monday thru Friday due to demand. (Charmicheal, 1979)

The University of Wisconsin Extension personnel involved with the Dial-A-Mini-Message program found that the most important aspect of the program was the constant need for promotional efforts. The system utilized all forms of promotion. The local newspaper was identified as the source of first contact with the service by 31% of the people surveyed after the first year of operation. The Dial-A-Mini-Message system also distributed 30,000 brochures each year. In fact, several local industries included the brochures in their employees pay envelopes.

Several of the County Board Supervisors also enclosed a Dial-A-Mini-Message brochure in their newsletter to constituents. (Charmicheal, 1979)

METHODS & PROCEDURES OF THIS STUDY

Stage One: Preparation of the Pilot Project

The Extension Energy Tips pilot project was planned in three stages. Stage one was the preparatory stage. During this period the state of the art in telecommunication information systems was examined. After careful consideration it was decided that the J-TEC Telecassette unit model 34A-1 would be used in the study.

The J-TEC Telecassette is a dial access player which provides automatic playing of messages prerecorded on standard tape cassettes. The following equipment is required to establish the system; one model 34A-1 Telecassette unit; one model TC-100 Coupler; one business telephone line; one telephone keyset with pushbuttons and a "hold" button; one RJ13C modular jack. An advantage of this system was its design which is geared for owner installation in a matter of minutes.

After selection of a system the process of site and topic selection began. To establish the degree of interest in this type of system and ascertain the main topics of concern, a state wide survey of County Extension Directors was conducted. This survey requested that each director identify the ten most frequently asked energy questions in their county. From the results of the survey (Appendix 1) we obtained the 100 topics which were used in the project.

As a result of our correspondence with the various county extension directors it came to our attention that the Director of the Sarasota County Extension Service, was interested in establishing a telecassette system for information dissemination. Upon further discussions with the County Director it was decided that the pilot study for the Extension Energy Tips program would be conducted in Sarasota County. Thus benefiting both the study and the county by providing an initial information package for the proposed Extension's Library on Tape service.

With system and site selection complete and the topics chosen the next order of business was to gather and screen resource materials. The search yielded an overwhelming supply of energy information from a wide variety of sources. To establish a comprehensive resource library,energy materials were obtained from government, industry and commercial sources.(Appendix 2)

These materials were used to to develop the scripts utilized in this project (Appendix 3). Development of the scripts turned out to be one of the most tedious and time consuming aspects of the entire study.

Once the information was found, it was synthesized into an answer and prepared in script form. The scripts were all constructed in a conversational mode. The initial script was then reviewed by various IFAS specialists for technical accuracy. This process took several months. Upon specialist approval the scripts were sent to the IFAS Editorial Department for taping.

The taped messages ranged in length from 15 seconds to 3 minutes and 45 seconds. Each tape was assigned a code number and a descriptive title. Both of these were used in all public release information.

While the scripts were in the review process, work was begun on the promotional materials needed for the study. An identification symbol was decided upon. The title selected for the system was "Extension's Energy Tips". This was chosen primarily for its future compatability with the expansion planned by the Sarasota County Extension Director. The expanded system will be called "Extension's Library on Tape" with each new unit being a "Tips" subsection.

Once the symbol and name were chosen, work began on the types of promotional materials to be employed. Since this was a totally new system it was decided that a large wide angle promotion push would be the best approach. The main features of this progaram would be two fold. The distribution of "Extension's Energy Tips" brochures would be combined with considerable radio promotion. Distribution of posters and television appearances were also employed.

Brochures contained a complete listing of all topics and listed the telephone numbers of the service. These brochures were distributed at all extension meetings, including energy fairs. They were also displayed in the main extension office. In addition all persons on the county extension mailing list were sent a copy of the brochure.

The radio promotion effort included six taped interviews, two live radio shows and public service announcements on seven stations. Newspaper coverage included only two feature articles, one listing all topics offered and several small articles which appeared somewhat irregularly. Project budget constraints limited advertising to Public Service Announcements. Due to scheduling difficulties only two television appearances were made.

All the promotional activities began the second week after the system became operational. From initiation of the study to the time of its implmentation required approximately ten months. The majority of this time was utilized in tape development and review.

Stage Two: Implementation of the Pilot Project

The next stage was the implementation of the system. The service was established in the Sarasota County Extension office under the direct supervision of the County Director.

The system operated according to the following management system which was outlined in the management handbook (Appendix 4). The receptionist-operator was responsible for daily operation and maintenance of the system. The County Extension Director coordinated overall county activities for the Extension's Energy Tips system. County extension agents provided publicity for the program.

At the University of Florida the Project Director served as a liasion, coordinating exchanges between the involved groups. The Project Manager insured that all components of the project were completed and that deadlines were met. The Editorial Department Cooperator functioned as an adjunct production supervisor. With the major responsibility of tape production.

Following is a scenario of the daily operation of the system. A call is received by the receptionist-operator. The tape requested is played for the caller. If the caller is unsure of which tape is needed,the receptionist-operator aided them in making a choice. Once the caller has heard the tape they hung up if they have no further questions, or they stay on the line and speak with the receptionist-operator about their question or request.

Each time the receptionist-operator received a call the following information was gathered; 1.)Name of the caller, 2.)tape requested, 3.)time of day the call was received and 4.)address and/or phone number of the caller. If the caller requested a publication this information was recorded and the publication promptly mailed. At the end of each day the receptionist-operator collected the data on a special data sheet. Each month the data sheets were mailed to the Project Manager.

Stage Three: Evaluation of the Pilot Project

The evaluation process began several months before the system was implemented. The first step involved the development of survey instruments. This was undertaken by the project manager with input from the project director, the Sarasota County Extension Director and other IFAS personnel.

The survey instruments (Appendix 5 & 6) were reviewed and rewritten several times until all parties were satisfied. The development of the evaluation instruments required three months. At the end of this time the study had produced two survey forms.

One survey form was sent only to Extension's Energy Tips system users. This survey was conducted by mail. Each service user received a survey instrument accompanied by two cover letters (Appendix 7) and a preaddressed stamped envelope. This group also received a reminder postcard ten days after the survey instrument was mailed.

The second survey involved a random sample of the general public of Sarasota and the surrounding areas. This survey group was chosen from the General Telephone Company Sarasota and nearby communities June 1980 telephone directory. The sample was taken from the telephone directory for two reasons. First only people with access to a telephone would be able to utilize the system. Secondly, this method was simple,straightforward and inexpensive.

The following method was used to select this sample. The person chosen was selected by beginning at the first name in the middle column of each page, then counting down 9 names. The tenth name in the column was used for the survey. If the tenth name was that of a business or if the number was not in service, the next name was used. This process continued until an acceptable name was located.

After the list of names for the survey group was obtained, each person on this list was called. These people were called over a three day period, with the time of the call varying from 9am until 9pm. After the three day period a total of 205 people had been contacted.

RESULTS

The evaluation of this program utilized data collected from system users and the general public. The general public was surveyed to determine their awarness of the system and to obtain their opinions about the energy situation. Accurate records of system usage were kept by the receptionist-operator. The system users were surveyed to obtain their opinions about the system.

Usage Data

The system received 41 calls. And answered 101 inquiries. The majority of call were received between the hours of 9:00am and 1:30pm. With another peak in activity occuring between 3:00pm and 4:30pm.

The most frequently requested tape was entitled "Swimming Pool Heating With Solar Energy". The next most popular tape was "What Is The Potential For Using Wind Energy In Florida?". The compilation of tapes requested more than once can be found in (Table 1).

TABLE 1

Title of Tape.	Number of Requests.
What is the potential for using wind energy in Florida?	9
Weatherstripping a door.	2
Roofing Color.	2
Insulating your water heater.	2
Installing reflective window film.	2
Lowering the temperature on your water heater.	3
Energy saving laundry tips.	2
How high should my water heater temperature be set?	4
Using a timer on your water heater.	8
How to read your electric meter.	2
Swimming pool heating with solar energy.	12
What is a solar water heater?	2
What kind of solar collector should I buy?	7
How can I protect myself when buying solar energy equipment?	7
Do microwave ovens rally save energy?	3
Planting trees for shade.	2
Shade tree varieties for south Florida.	2
Low Maintenance Landscapes.	3
How can I have a low maintenance landscape?	4
The path to a low maintenance landscape.	5

User Survey

Another aspect of the evaluation was the survey of system users conducted by mail. Each system user was sent a survey instrument along with two cover letters. One of the cover letters was from the University of Florida staff involved with the project. The second cover letter was written by the Sarasota County Extension Director. This added more community identity to the project evaluation.

The survey instrument with accompanying cover letters was sent to each user. Ten days later a reminder postcard was sent to everyone on the survey list. This mailing strategy yielded an 80% survey response rate.

The instrument (Appendix 5) used covered a variety of points. There were several questions concerned with system operation and user satisfaction. Another area of questioning dealt with the changes made by users as a resulting from their use of the system. One avenue of questioning attempted to determine how much money the user spent on energy conservation over the past four months and how much they planned to spend within the next year. The attitude of the respondents toward the energy situation was covered by two questions. Demographic data about the users were also collected.

-System Awarness-

Data indicates that 28% of the people first learned about the system from contact with Extension personnel. Another 26% of the people identified the newspaper as their information source. Ninteen percent of the users said that Extension Energy Tips brochures were their first contact with the system. The remaining 27% of the people identified radio, television, friends, or the Extension newsletter as the source of their knowledge.

TABLE 2

How did you first learn about the system?

Information Source	Percent	Bar Graph
Extension Personnel	28	**********
Newspaper	26	*********
Brochure	19	******
Radio	4	*
Television	6	**
Friends	9	***
Exten. Newsletter	8	**

-Average System Useage-

Finding indicate that 70% of the users had never used a telephone-taped message system before. The survey asked how many times each user had called the system. The average number of calls per user was two. With one person using the system a total of tweleve times.

The reasons given by people for using the service were of interest to this study. Over half of the people (53%) wanted general information when calling the service. Twenty-nine percent of the people calling had a specific problem. Another 14% of the people gave curiosity as their reason for using the service.

-Client Satisfaction-

The next group of questions dealt with user satisfaction. Findings indicate that 98% of the people surveyed would use the system again. This agrees with the data which indicated that 72% of the users said that they were very satisfied with the system they received. Eighty-five percent of the users indicated that the information on the taped message answered their question. Data shows that 95% of the people surveyed understood the taped messages. Further,95% of the respondents think that the Extension Energy Tips system is a practical way to receive energy information.

-Attitudes Toward System Useage-

The goals of this serivce are to educate and bring about useful changes. The data indicates that 39% of the users said that use of the Extension Energy Tips serivce changed their general attitude toward energy issues.

When asked which method they would prefer utilizing to receive energy information, 51% of the respondents indicated the Extension's Energy Tips service. Another 33% indicated they would prefer talking with an Extension Agent on the telephone.

Only 8% of the people surveyed indicated a preference for visiting the County Extension Office. The remaining 8% were divided into two factions. One of these prefered using all of the previously mentioned methods together. The second group prefered gaining energy information from written material.

TABLE 3

What method would you prefer using to receive Energy Information?

Method Prefered	Percent	Bar Graph
Extension's Energy Tips	51	**********
Talking with an Extension Agent	33	*******
Visiting the County Office	8	**
Combining all other methods	4	*
Written Material	4	*

-User Awarness of the Cooperative Extension Service-

One of the questions on the survey dealt with the users prior knowledge of the Extension service, the various agents and what names they identify with the Extension service. Findings indicate that 100% of the people surveyed had some previous contact with the Cooperative Extnesion Service or one of the Extension agents. Only 25% of the people identify with the official title "Sarasota County Cooperative Extension Serivce." Another 24% recognized the title "Extension Service". Addtional data from this question idicates that the two most recognized agent titles were "Home Economist"(10%) and "Ornamental Horticulture Agent"(10%). The term "County Agent" was identified by only 8% of the respondents. The least recognized agent title was "4-H Agent" with only 1% of the respondents identifying this title.

TABLE 4

What names do you identify with the Extension Service?

Name Identified	Percent	Bar Graph
Sarasota County Cooperative Extension Service.	25	********
Extension Service	24	********
Home Economist	10	***
Ornamental Horticulture Agent	10	***
County Agent	8	**
All other titles and agents	23	*******

-Message Quality-

When examining the quality of the taped material itself,the group was concerned primarily with three cahracteristics, ease of understanding, usefulnes of material, ease of application of material. The results indicate that 95% of the people survied understood the taped message. Data also indicated that 95% of the users found the information useful to them. In addition 65% of the respondents indicated that they found the information very easy to apply.

TABLE 5

Parameters of Message Quality: Understanding,Usefulness and ease of Application.

Quality Parameter	Percent	Bar Graph
Understood Message	95	**********
Found Information Useful	95	**********
Found Information easy to Apply	65	**********

Service users were also questioned about the length of the taped messages. Sixty-seven percent of the users said that the taped messages were abut the right length. Another 30% said that the taped messages were too short. Only 3% found the messages too long.

-Perception of the Energy Situation-

When asked how serious the present energy situation is in the United States, 63% of the respondents indicated very serious. Thrity-five percent indicated that the situation was fairly serious. Only 2% of the people questioned felt that the energy situation was not at all serious.

TABLE 6

How serious do you think the U. S. Energy Situation is at present?

Seriousness Level	Percent	Bar Graph
Very Serious	63	**********
Fairly Serious	35	**********
Not At All Serious	2	*

This same group was asked how serious they thought the energy situation would be in five years. Eight-five percent said they thought it would be very serious. An additional 13% stated that the situation would be fairly serious in five years. Only 2% felt that the enrgy situation would be not at all serious in the next five years.

TABLE 7

How serious do you think the Energy Situation will be in the U. S. within the next five years?

Seriousness Level	Percent	Bar Graph
Very Serious	85	**********
Fairly Serious	13	****
Not At All Serious	2	*

-Behavioral Effects-

One of the goals of any Extension program is to bring about a positive change in either the behaviour or attitude of the client. Findings indicate that 39% of the Extension Energy Tips users made some changes in their lifestyle or surroundings as a result of the information they received. The respondents were asked about the changes they made in both their surroundings and behaviour. A few of the more frequently identified changes were :1.)weatherstripping doors and windows, 2.)investing in a solar water heater, 3.)raising the thermostat when using air conditioning or lowering the thermostat when using the heater, 4.)installing a timer on the water heater or manually turning it off during the day, 5.)lowering the temperature on the water and 6.)joining a carpool.

Some of the other changes made by people included : 1.)using the clothes dryer less often, 2.)buying a more efficient water heater, 3.)riding a bicycle on short trips instead of driving the car,4.)closing the drapes when using the air conditioner, 5.)buying a ceiling fan, 6.)cleaning air conditioning filters, 7.)closing off unused rooms, turning off excess lights, 8.)eliminating use of air conditioning, using sunlight instead of central heating, 9.)buying a more efficient stove, 10.)turning off the oven during the last 20 minutes of cooking time, 11.)planting shade trees, 12.)installing an air conditioner converter on the water heater, 13.)using solar energy to heat the pool, stopped letting the car idle while waiting, 14.)applied more insulation and put reflective window film up, 15.)made paths in the back yard to reduce the need for mowing, 16.)added mulch to flower beds to reduce the need to weed, 17.)monitored electric use to take advantage of off peak hours.

One person said that using the system did not result in any changes in his lifestyle or surroundings because he was "already in agreement" with the ideas covered in the taped messages. This person went on to say that he already had a solar water heater and a solar pool heater. He had also purchased a solar assisted heat pump.

-Investment in Energy Conservation-

The next question in the survey asked the user how much money they had spent on energy saving devices over the last four months. Seventeen people had spent a total of $18,700. The amounts spent ranged from $10 to $6000.

The next question asked, if the respondent had not spent any money on energy saving devices, did they plan to within the next six months to one year. Fifty-two percent of the people answering this question said they planned to spend money on energy saving device. Nine people in this group estimated how much they planned to spend. The total was $10,000, with planned expenditures ranging from $100 to $3500.

-Cost-To-Saving Ratio-

The study also determined a cost-to-savings ratio for this system, based on the three month pilot period. The ratio makes the assumption that energy conservation money investments would produce energy cost savings within five years at least equal to the investment. The cost($9800)-to-savings($28,700) ratio for the Extension Energy Tips system would be about 1:3. This ratio indicates that for every dollar invested in this system three dollars in energy savings resulted. This ratio does not take into consideration the savings resulting from behavioural or lifestyle changes. Also as the system gains more users the ratio should become greater.

-Profile of Users-

The demographic profile of the users raised a few interesting points. Data showes that all of the system users were caucasisn. There was no minority representation among the users of the system. The average age of a user was 55. The youngest user was 26 while the oldest user was 76. The users were almost equally divided according to sex. Fifty-six percent of the users were male. The study showed that 85% of the users lived in single family homes, with the remainder dwelling in condominiums, apartments, duplexs or mobile homes.

The family income level of users was also ascertained. Data indicates that 34% of the respondents reported a 1980 yearly income of $25,000 or more. Only 7% of the respondents reported an income of under $5000 for 1980.

All of the users reported at least a partial high school education. Ten percent stated that they had some high school. Thirty-two percent indicated that they had completed high school or its equivalent. Another 35% had completed four years of college. And 23% had completed some graduate or professional school.

The employment status of users was also examined. Findings indicate that 37% of the users were retired. An additional 20% identified themselves as full-time homemakers. Full-time workers accounted for 19% of the users. Another 12% said they were self-employed. Only 2% of the people surveyed were unemployed.

TABLE 8

Employment Status of Users.

Employment Status	Percent	Bar Graph
Retired	37	**********
Full-time Homemaker	20	******
Full-time Worker	19	******
Self-employed	12	****
Unemployed	2	*

Another important consideration was where the users lived. Were they rural inhabiatants or urban residents. Thirty-two percent of the people lived in a city of 19,001 to 50,000 people. Another 24% said they lived in the country, but not on a farm. While only 3% said they lived on a farm. Eighteen percent of the respondents said they lived in a city larger than 50,000 people. From this data it seems safe to say that over half of the people could be identified as urban residents.

The study group was interested in determining if several variables of the survey were independent of each other or related. To examine these possible relationships, statistical analysis was conducted. Kendall's tau was used for producing standardized coeffidients based on the amount of agreement between two sets of ordinal rankings. No correlation was indicated between any of the variables examined.

General Public Survey

The third area of evaluation involved a random sample of the general public. This sample was selected from the General Telephone Company June 1980 telephone directory. This method of sample selection was chosen for its ease and because it was a fair representation of the potential audience (telephone owners) of the program.

The telephone survey had a total sample size of 205 people. These people were contacted at various times over a three day period. The person conducting the survey first identified the agency represented as the Sarasota County Cooperative Extension Service, or the Ag Department. The surveyor then asked if the respondent would like to participate in the telephone survey. Twenty-two percent of the people contacted were not interested in participating in the survey.

-Knowledge of the Cooperative Extension Service-

The results of the general public survey were quite interesting. One of the most important things learned from this study did not show up on any questionnaire. This was that a majority of the people contacted in the telephone survey had no idea who or what the County Cooperative Extension Service was. This had quite a bearing on the results of the other survey activity.

-Reducing Energy Expenses-

The first question on the survey was concerned with saving money on energy costs. Sixty-three percent of the people participating indicated an interest in saving money on energy costs. The remaining 37% had no interest in saving money.

TABLE 9

Are you interested in saving money on your energy costs?

Interest Level	Percent	Bar Graph
Interested	63	**********
Not Interested	37	**********

-System Awarness and Interest-

Eighty percent of the people surveyed were not aware of the Extension Energy Tips system. These people were told about the system. Then asked if they would be use the system now that they knew about it. Fourty-one percent of the people in this group stated that they would be interested in using the system

TABLE 10

Are you aware of the Extension's Energy Tips system? The people who were not aware were told about the system then they were asked if they would be interested in using the system?

Awarness of System	Percent	Bar Graph
Knew about system	80	********
Did not know about system.	20	******

Interest in Using the System.	Percent	Bar Graph
Interested	41	**********
Not Interested	59	**********

Twenty percent of the people questioned were aware of the Extensions Energy Tips service. However, only 6% of this group had used the service.

-Perceptions of the Energy Situation-

The people participating in this survey were asked two questions concerning energy attitudes. The first dealt with the seriousness of the present U.S. energy situation. Findings indicate that 54% of the people questioned stated that the energy situation was very serious. Another 35% felt that the energy situation was serious. The remaining 11% of the respondents felt that the energy situation was not at all serious.

TABLE 11

How serious do you think the U. S. Energy Situation is at present?

Seriousness Level	Percent	Bar Graph
Very Serious	54	**********
Fairly Serious	35	*******
Not At All Serious	11	**

The second question asked how serious the U.S. energy situation would become over the next five years.

The majority of people asked this question (65%), said that the energy situation would be very serious within the next five years. Another 22% of the people stated that the energy situation within the next five years would be serious. The final 13% of the people felt that the energy situation would be not at all serious within the next five years.

TABLE 12

How serious do you think the U. S. Energy Situation will be within the next five years?

Seriousness Level	Percent	Bar Graph
Very Serious	65	**********
Fairly Serious	22	*******
Not At All Serious	13	***

Here are some of the opinions and feelings which were gathered during the survey. Several people stated that there is "nothing I can do about it (the energy situation or te high cost of energy) anyway". A few people told the interviewer that they "Can't be bothered" with such things as energy concerns or surveys. Another group of people said that "I rent so there is nothing I can do". One of the other commonly received statements was "it (the energy situation) is not as bad as they say". This was voiced more strongly by one person who said that "we are being put on by the Arabs". There was even one person who said the only problem America had was inflation. This person felt that if we could "save the dollar" we could then afford to pay as much as necessary for energy.

All of the comments received were not negative. One person said "We must have conservation", however this person was not interested in using the service. Another person said "if people don't conserve we're going to run out", this person was not interested in using the service either. One person said the he had "done lots of things" to conserve energy and would not be interested in using the serice.

By far the most frequent comments indicated thefrustration of the person being interviewed. Most people whether they were interested in using the serivce or not expressed a feeling of being misinformed about the energy situation. These people also seemed to be at the end of their rope with no other avenues of conservation and saving open to them.

SUMMARY

-Awarness of the Extension Service-

The results of both the general public survey and the user survey indicate that the Extension Service has an identity crisis among non-traditional users. This is emphasized by the fact that all of the users had previous contact with the extension service. The data shows that despite the promotional efforts made in this study, 80% of the people contacted in the general public telephone survey were not aware of the Extension Energy Tips service. This accentuates the importance of sustained publicity for new programs. Also the publicity approaches used do not reach enough of the non-traditional audience to have any appreciable affect.

-System Review-

The system used in this study was a success in several ways. Nintey-eight percent of the users said that they would use the Extension Energy Tips service again. Nintey-five percent of the people surveyed thought that the Extension Energy Tips service was a practical way to get energy information. Finally 98% of the users would like to see the service expanded to include other topics.

-Material Quality-

The materials used in the study were also rated by the users. When asked if the information in the taped message answered their question, 85% of the people indicated that it had answered their question. The taped messges were understood by 95% of the people who used them. And 72% of the people were very satisfied with the service they received.

One of the survey respondents felt the need to add a few comments to the survey instrument. Here are those remarks: "Thank you. I appreciate the further interest shown by my Alma Mater (UF) in helping to rectify energy problems through a program such as this. Better methods to make this program known by the general public is the only real flaw I can see. But this is a start in the proper direction for correction on our nation and state's future energy problems. I do hope that it's (the program's) distribution/notice/use by the general Florida public is increased."

-Cost-To-Savings Implecations-

The cost-to-savings ratio for this system was computed based on the three month pilot period. The basic assumption of this ratio is that energy conservation money investments will produce energy cost savings within five years at least equal to the original investment. The cost ($9800)-to-savings($28,700) ratio of the Extension's Energy Tips system was about 1:3. This means that for each dollar invested in this system three dollars in energy savings will be generated. Three quarters of the cost resulted from equipment and study expendatures. This means that as the system continues operation the cost-to-savings ratio will increase. Also the ratio does not take into consideration the energy savings generated by behavioral or lifestyle changes resulting from system use.

-System Effects-

The results show that the people using the service were sufficiently impressed with the quality of the service that serveral of them took action and spent money based on the information they received . This willingness to change their energy related behaviour and spend money to conserve energy indicates that the service has succeded in two of the goals of extension programs. First, it has educated the people about various energy facts and given them some new alternatives. It has also helped bring about a change of attitude concerning energy on the part of serveral people.

REFERENCES

Alson,Jo; Cesnick,Bernard I.."Telephone Evaluations of Critical Situations." April '78.

Anonymous. "Consumer Phoneline Helps Smooth Bumps." Newspaper Article.

Anonymous. "The Disssemination System of the Idaho State Department of Education." Idaho State Department of Education, Boise. July '78.

Anonymous. "Energy Education Materials Inventory (E.E.M.I.). Part One: Print Materials." Energy and Man's Environment, Inc. Portland, Or. Sept.'76.

Anonymous. "TELECOM 2000: An Exploration of the Long-term Development of Telecomunications in Australia. Australian Telecommunications Commission, Melbourne. July '76.

Anonymous. "Texas Telecomputer Grid/Bilingual Career Education Demonstration Project. Final Project Performance Report." American Technologcal University Killeen, TX. 1976.

Arbeiter, Solomon, and others. "Telephone Counseling for Home Based Adults. Final Report" college Entrance Examination Board. Policy Studies in Education, N.Y. New York, 1978.

Baizerman, Micheal, and others. "Self-Evaluation Handbook for Hotline and Youth Crisis Centers." Minnesota University, Minneapolis Center for Youth Development and Research. May '76.

Bennett,A.M., and others. "Telehealth Handbook. A guide to Telecommunications for Rural Health Care." Miter Corporation, McLean,VA. May '78.

Blackwood,Helen and Trent,Curtis. "A Comparison of Effectiveness of Face to Face and Remote Teaching in Communicating Educational Informaiton to Adults." Manhattan: Kansas State University, Cooperative Extension Serivce. Oct.1968.

Carmicheal, Erna. "Promotion is Survival." Dial Access: A Way to Spread Your Message. University of Wisconsin-Extension Center for Interactive Instructional Programs. June 1979.

Carroll,John M.;Tauge,Jean M. "Community Information Centers and the Compter." 1975.

Christensen, Janice R. "Extension Teletip? I Uncerstand You Know Everything." Dial Access: A Way to Spread Your Message. University of Wisconsin-Extension Center for Interactive Instructional Programs. June 1979.

Delaney, Charles. "Clark University System Operations." Personal Coversation. University of Florida. Feb. 1980.

Farrell,Elva; Meadows,Jeannette; Rozar, L.L. Unpublished Research. Sarasota County, Florida. May 1979.

Fuller, Joyce. "A Public Library's Dial Access Service." Dial Access: A Way to Spread Your Message. University of Wisconsin-Extension Center for Interactive Instructional Programs. June 1979.

Hodges,J.B. "Research and Diffusion Process: P.K.-Young Laboratory School." University of Florida May 1977.

Hopkins,Cleve. "Community Information and Services Centers: Concepts for Activation." Institute of Telecommunications (D.O.C.). Washington,D.C. July 1976.

Houseman, Edward M., Ed. "Survey of Current Systems for Selective Dissemination of Information. (SDI)." American Society for Information Science, Washingtion, D.C., June 1969.

Hulbert,James H. "The Changing World of Telecommunicantions." Nov.1978.

Hull,William L. and others. "Research Needs in Diffusion, Change and Information Systems." Ohio State University, Columbus National Center for Research in Vo-Ed. Oct.1978.

King,Geraldine B.; Berry, Rachel. "Evaluation of the University of Minnesota Libraries Reference Department Telephone Information Service. Pilot Study." Minnesota Unversity, May 1973.

Lent,Richard. "Planning for Future University College Programs: A Cost-Effectiveness Evaluation of Alternative Instructional Delivery Systems." Syracuse University, New York. University College Sept.1976.

Mazer,Homer F. and Brown,Emory J. "Effectiveness of Cooperative Extension Service Newsletters with different formats . Received by Dairymen in Pennsylvania." Paper presented at the Adult Education Research Conference. 1970.

Rostow, Eugene V. "A Survey of Telecommunications Technology. Part I. President's Task Force on Communications Policy. Staff Paper One, Part I." President's Task Force on Communications Policy, Washington, D.C. June 1979.

Saffian,Steven R. "Dial: A New Campus Information Access System." NASPA Journal, Oct. 1973.

Spak, Gale Tenen, and Shelley, Edwin F. "How to Operate an Energy Advisory Sevice, Vols. I,II and III." New York Institute of Technology, Old Westbury. June 1978.

University of Wisconsin Extension Communication Programs. "The Status of the Telephone in Education." Paper Presented at the Second Annual International Communications Conference. 1976.

Vallens, Richard. "TEL-Law of Orange County: History, How To's, Hot Tips." Dial Access: A Way to Spread Your Message. University of Wisconsin-Extension Center for Interactive Instructional Programs. June 1979.

APPENDIX 1

Results of the County Director Survey

APPENDIX 1

Results of the County Director Survey

	Topics identified by County Directors.	Number of Question about each Topic
1.)	Energy Conservation.	76
2.)	Insulation and Weatherization.	66
3.)	Solar Energy.	50
4.)	Appliance Information.	33
	Heating, Ventilation and Air Conditioning.	33
5.)	Alcohol and Gasohol.	*28
6.)	Energy Policy and General Information.	21
7.)	Landscaping and Greenhouse.	19
8.)	Alternative Eenrgy Sources(except Solar).	13
9.)	Agricultural Energy Use.	12
10.)	Methane.	7
11.)	Nuclear Energy.	2
12.)	Methanol.	1
	Gasification.	1

*Most of the questions concerning this topic had many different parts.

APPENDIX 2
Books Used to Develop Scripts

APPENDIX 2
Books Used to Develop Scripts

"Energy Savers Catalog" by The Editors of Consumer Guide. Beekman House, 1979.
"The Complete Energy-Saving Handbook for Homeowners" by James W. Morrison. Harper & Row Pub.. 1979.
"The Home Energy Saver" by The Editors of Consumer Guide. Fawcett Books. 1979.
"Homeowner's Guide to Saving Energy" by B.L. Prices and J.T. Price. TAB Books. 1976.
"You Fix It : Insulation" by J. LoSchiavo and F. LoCicero. ARCO Publishing Comp.. 1975.
"Energy-Saving Projects You Can Build" by The Editors of Better Homes and Gardens Books. Meredith Corp.. 1975.
"How to Insulate Your Home and Save Fuel by The U.S. Dept. of Housing and Urban Development. Dover Publ.Inc. 1975
"How to Cut Your Energy Bills" by R. Derven & C. Nichols. Structures Publ. Comp.. 1976.
"Sun Up to Sun Down" by Shawn Buckley. McGraw-Hill Book Company. 1979.
"How To Beat the Energy Crisis and Still Live in Style" by Bill Baker. Functional Creations. 1979.
"Natural Solar Architechture a passive primer" by David Wright. Van Nostrand Reinhold Comp. 1978.
"The Homeowner's Energy Guide" by John A. Murphy. Thomas Y. Crowell Company. 1976.
"Your Guide to Energy-Saving Home Improvements" by Abt Assoc. Inc.. Bisset & Dunlap Inc. 1977.
"200 Ways to Save on Energy in the Home -- and still be comfortable" by George B. Roscoe. Acropolis Books Ltd.
"Build Your Own Solar Water Heater" by Stu Cambie. Garden Way Assoc. Inc. 1978

APPENDIX 3

Management System

MANAGEMENT SYSTEM

This booklet outlines the roles and responsibilities of all organizations, groups and individuals within a group who are involved with this project.

Sarasota County Cooperative Extension Office Staff.

RECEPTIONIST - OPERATOR

Responsibilities

1 - Daily control of the system

2 - Answer all telephone calls comming into the Energy Tips System

3 - Log all incomming calls. Keep the following information for each call.

A. Time of Day call was received

B. Tape requested or decided upon

C. Name, address and telephone number of caller, if possible

4 - Aid caller with tape choice when needed or requested.

5 - Direct callers to appropriate agency, if the County Cooperative Extension Office cannot help them.

6 - Operate machinery.

7 - See that tapes are kept in order and in good repair (Notify C.L. Sheffield if a tape needs to be replaced).

COUNTY EXTENSION DIRECTOR (Mr. Luther L. Rozar)

The role of the local County Extension Director was overall county activity coordination for the Energy Tips Project. The County Extension Director set the tone of the County Cooperative Extension Office as far as attitude toward the Energy Tips Project was concerned.

Responsibilities The responsibilities of the county director include

1 - Supervision of the daily operation

2 - Coordination of publicity activities within the county

3 - Facilitate cooperation of staff

COUNTY EXTENSION AGENTS

The role of the county extension agents was to encourage grassroots publicity of the Energy Tips Service.

Responsibilities

1 - Encourage the use of the Energy Tips System among their contacts.

2 - They also referred people with questions concerning Energy to the Energy Tips Service.

3 - An additional responsibility was the intergration of the service into their daily activities by making use of the service to answer client's questions.

IFAS UNIVERSITY STAFF

Agricultural and Extension Education Department

Project Director (Dr. Wm.s. Farrington)

The director of this project's primary role was that of liasion. He coordinated exchanges between the various groups involved. He also facilitated work relationships within and among each department involved.

Responsibilities - The project director was responsible for:

1 - Final review and appraisal of all outgoing work

2 - Liasion activities wherever and whenever needed

3 - Supervision of the project Graduate Assistant

Project Manager (Cynthia Sheffield)

The project manager was to insure that all components of the project were completed and that all deadlines were met.

Responsibilities - The manager was responsible for:

1 - Establishing a cooperative relationship with all persons involved in this project. These persons/groups of people were

   A. Sarasota County Cooperative Extension Office Personnel

   B. IFAS Editorial Department Staff

   C. Various IFAS specialists

2 - A major responsibility was the gathering and screening of reference materials for Energy Tips Service resource data bank, and script preparation.

3 - Preparation of Energy Scripts and insuring that Energy Scripts were checked for technical accuracy by IFAS specialists prior to production.

4 - Preparation of the publicity campaign package, including:

A. Radio Releases

B. T.V. Releases

C. Newspaper Articles

D. Brochures and Posters

5 - The project manager was also incharge of the evaluation of the service, planning and preparation of all survey instruments, log sheets and other data recording items.

6 - Data collection and the subsequent analysis and interpretation

7 - Preparation of a final project report and evaluation results.

EDITORIAL DEPARTMENT

The Editorial Department Cooperator (Marshall Breeze)

The Editorial Department cooperator functioned as our adjunct production supervisor.

Responsibilities - His responsibilities included:

1 -Supervision of the OPS student responsible for script editing, tape production, radio news release production and final preparation of news releases to the T.V. and newspaper.

2 - Faciliatate a smooth working relationship between the Agricultural and Extension Education Department project members and the Editorial Department members.

APPENDIX 4

Scripts of the Energy Conservation Tapes

WHAT MATERIALS CAN BE USED TO PRODUCE METHANE? (Tape # 50)

Almost all organic material can be broken down through anaberobic digestion to produce methane. However, the amount of gas produced and the economic feasibility varies greatly from material to material.

Organic matter is commonly divided into 3 groups: Urban Waste, Agricultural Wastes and Biomass Crops.

Two main kinds of urban wastes are: (1) sewage and (2) solid waste.

Sewage contains both human and industrial waste. The main source in human excrement, especially feces.

Solid waste can be used for methane production. It is generated on a daily basis by humans at the rate of 5-6 lbs/day. After removing glass, metal, wood and plastics, 3-4 lbs/day remain for methane production. Each pound of organic waste will produce about 4 cubic feet of methane gas.

Agricultural wastes are divided into two types (1) crop residues and (2) manures. Crop residues include any vegetable or grain crop residues as well as sugar cane, trash, weeds, corn stubble, straw and spoiled fodder.

Manure from farm animals as well as poultry litter, slaughter house wastes, and fishery wastes can also be used.

Biomass crops presently investigated for methane production include algae, kelp, and water hyacinths.

WHAT IS THE POTENTIAL FOR USING WIND ENERGY IN FLORIDA? (Tape # 60)

With the rising cost of fossil fuels, greater attention is being given to wind power as an energy source. Wind power has been used for thousands of years to help man do his work. Florida does not have the strong, steady winds which are ideal for windmill operation. Even in coastal areas, winds are steady but not very strong. Inland winds are usually light and variable. Therefore, to do the same amount of work much larger windmills are required in Florida than other parts of the country where wind is better.

Several problems are associated with wind energy. First, very high winds can damage wind energy systems. Second, is salt spray corrosion near the coast. A third problem is variability of wind speeds, which yields an unreliable energy source. The general feeling is that wind power as a large scale alternative energy source in Florida is not a good idea.

Before you build any new wind power system in Florida, carefully consider all the disadvantages.

WEATHERSTRIPPING A DOOR (Tape # 100)

Weatherstripping doors can greatly reduce air infiltration. But before weatherstripping, doors should be checked for proper fit. Door fit varies greatly and is affected by warping.

Doors are weatherstripped in three sections. The first section includes the sides and top. Section 2 consists of the door bottom and Section 3 is the threshold. A very durable material is recommended for the threshold and door bottom, while jamb weatherstripping is used for the sides and top.

The door casing or frame refers to the structure surrounding and supporting the door. The door jamb refers to the top and sides of the door frame that make contact with the door. The door sill is the part attached to the floor, including the treshold.

There are several materials available for door top and sides. Felt weatherstrip is a low cost material in various widths and thicknesses. Aluminum and felt strip is an aluminum strip crimped to thin felt strip. Self-adhesive foam strip is high-grade resilient sponge rubber or vinyl with paper or vinyl backing in thicknesses up to 3/8 of an inch and widths up to 3/4 of an inch. Finally, vinyl weatherstrip is a general-purpose moisture and temperature resistant strip. It is tube shaped for a tight fit. Two basic types of weatherstripping available for attachment to door bottoms are door sweeps and door shoes. A door sweep is a metal strip fastened to a vinyl or neoprene sweep. It keeps out drafts by pressing across the top of a threshold when the door is closed. A sweep is screwed on the bottom of a door. Sweeps are low-priced and easy to install. Most door shoes consisit of an aluminum retainer holding a rounded vinly ridge, and they attach to the underside of the door. The aluminum retainer is screwed to the door's bottom edge and the vinyl ridge presses down against the threhold to keep out drafts when the door is closed.

A threshold fastens to the floor under a door. It helps to seal the air space under the door by working in with the door's bottom edge or a companion piece fastened to the door's bottom edge.

Various thresholds are available. Saddles are low and flat, and beveled along both edges. They are available in hardwood and metal. A saddle should be used in combination with a door shoe or door sweep for the most effective seal.

A vinyl-gasket threshold works in combination with the underside of a door to seal up the space. The vinyl gasket keeps out dust, drafts and water. Vinyl may be worn out by foot traffic, reducing its effectiveness. Replacement vinyl inserts are readily available. The interlocking threshold consists of two interlocking parts. The threshold itself fastens to the floor and to the door sill and the hook strip fastens to the door's bottom. However the interlocking threshold is difficult to install.

For detailed instructions on the installation of threshold, door bottom and jamb weatherstripping, see The Cooperative Extension Publication.

Source: Energy Phone Operator's Manual, Clark University
Science, Technology and Society Program

ROOFING COLOR (Tape #101)

From the standpoint of Energy Conservation, a light-colored roof is recommended. Most homes benefit more from a light roof in the summer than they would from a dark roof in winter. If you live in a warm climate, remember that light-colored roofing can keep your house cooler. Lighter colors reflect the sun's rays and provide a cooler interior. They can make a difference of as much as twenty degrees or more.

Light colored composition shingles absorb about half as much direct solar heat as black or dark shingles. White marble chips on flat or low-pitched roofs absorb about one-third as much direct solar heat as dark chips. Houses with high-pitched roofs are cooler that those with low-pitched or flat roofs. Roof slopes facing north and south are cooler than those facing east and west.

Source: Tips for Energy Savers

CHOOSING COST EFFECTIVE INSULATION MATERIAL (Tape #102)

Insulation is made from various materials and there is no one type that's best for all applications. Insulation types vary according to quality, thermal resistance in terms of the R-value, safety features, dimensions, and where and how they are applied. In choosing a type of insulation to do a specific job, factors to be considered are the R-value of the material to be used, the forms available for particular application and the cost of material and installation. Other considerations are toxicity, fire resistance, vermin and insect resistance, moisture problems and corrosion. Choosing the type of insulation to use is a complex process. For example, although an attic could be insulated with vermiculite, the cost would be four times as great as the same job done with glass fiber or rock wool. But vermiculite would be a good choice for hard-to-reach corners or wall areas.

The cost of insulation varies depending on whether you install it yourself of hire a contractor to do it. Other factors affecting the cost are the area where you make you purchase, supply and demand, and sales or specials which contractors sometimes offer off-season. The general material costs are based on R value per inch. The least expensive are cellulose, glass fiber and rock wool. In the medium price range are perlite and vermiculite. The most expensive materials are plastic foams, either rigid or blown in, and rigid glass fiver. Installation is cheaper if you do it yourself rather than hiring a contractor.

Source: Energy Phone Operator's Manual, Clark University, Science, Technology and Society Program.

VAPOR BARRIERS (Tape #103)

Household moisture results from cooking, washing, breathing, perspiring, and house-plants. A family of four can add as much as six gallons of water to the air per day. If moisture in insulation cannot escape, excess amounts may accumulate and cause loss of insulating efficiency, wood rotting, paint peeling and the deterioration of other structural components. Other problems are corrosion of metal, including contact points in electrical systems, resulting in a potential fire hazard. Moisture also reduces the effectiveness of flame retardents. A vapor barrier is used to prevent most of the household humidity from leaving the living space and getting into the insulation where it can condense and cause problems. The vapor barrier is a layer of impermeable, or low permeable substance, ranging from polyethylene and tar paper to kraft paper, and special paint. The vapor barrier should always be facing the heated area. But you are cautioned when installing new insulation over existing material. A second vapor barrier can cause severe condensation problems in the original material. If the insulation you purchased for a second layer does have a vapor barrier, slash it throughly with a knife to allow moisture to pass through. The permeability of a surface to vapor movement is usually expressed in "perms". The lower the perm number, the greater the resistance of the material to the passage of water vapor. To prevent a build-up of moisture in the wall, the perm value of the outside or cold side material should be several times greater (more permeable) than the inside or warm side material. An ideal ratio of perm ratings is at least five to one from the inside to the outside. The vapor barrier should always be installed facing the heated side of the space to be insulated.

Source: Energy Phone Operator's Manual, Clark University Science, Technology and Society Program.

MINIMUM RECOMMENDED R-VALUES (Tape #104)

As insulation guidelines, the U.S. Department of energy recommends the following minimum total R-values. The total R-value of ceiling insulation should be 26. Exterior wall insulation should have a total R-value of 13 and floors should be insulated to a total R-value of 11. Remember, these rates are suggested minimums. The higher the total R-value, the better the insulation.

Source: Energy Information Handbook: Center for Environment and Natural Resources.

The Home Energy Saving Book by Shellon Lamber, Shell Manager of Energy Economics.

TYPES OF INSULATION MATERIALS (Tape #105)

There are several types of insulation. Two of the most commonly used home insulation materials are Fiberglass and Cellulose. Other types of insulation materials include Vermiculite, Perlite, Rock Wool, Polystyrene and Urea-Formaldehyde. Let's take a look at each type....

Fiberglass is made up of finespun threads of glass woven into a yarn or blanket to serve as insulation material. It is relatively inexpensive and comes in batts, blankets and in bags for loose fill applications. By itself Fiberglass is fire resistant. However, the heavy paper that is often used as a backing on batts and blankets of Fiberglass is not. Fiberglass is an excellent and durable insulation material for use in walls, floors and ceilings.

Cellulose insulation is made of chemically treated wood pulp or shredded paper. It comes in blankets, batts, or loose fill forms. Cellulose has a higher R-value than either Fiberglass or Rock Wool, and it does not irritate the skin. But cellulose products are treated with chemicals that react with moisture in the air to form a substance that can corrode metal objects.

Vermiculite is a light weight material produced from mica. It comes in loose fill and can be blown or poured into hollow spaces. Vermiculite is a popular home insulating material primarily because of its low cost, wide distribution and easy installation. Two major disadvantages of Vermiculite are its tendency to settle and absorb moisture.

Perlite, which is formed from volcanic rock, has almost all of the same properties as Vermiculite. But, Perlite has a higher R-value than Vermiculite.

Rock Wool is a synthetic material which looks like and has many of the same properties of Fiberglass. It has nearly the same cost and R-value of Fiberglass, but unlike Fiberglass, it will not give off an odor, when dampened.

Polystyrene, which is commonly called styrofoam, is an excellent insulating material for exterior walls and around slab foundations. Polystyrene is moisture resistant but it is highly combustible. It is used primarily in new construction because it is rigid.

Urea-Formaldehyde is a foam type insulation with a very high R-value. It is both fire resistant and sound proof. Urea-Formaldehyde requires expensive installation equipment and cannot be handled in a do-it-yourself manner. It can shrink and also give off noxious fumes. But if it's installed by a qualified contractor, Urea-Formaldehyde is one of the most effective insulating materials available.

Source: Energy Handbook Information Handbook - CENRP
North Carolina Teletip #4126

MINIMUM RECOMMENDED R-VALUES (Tape #106)

As insulation guidelines, the U.S. Department of Energy Recommends the following minimum total R-values. The total R-value of ceiling insulation should be 26. Exterior wall insulation should have a total R-value of 13, and floors should be insulated to a total R-value of 11.

Remember, these rates are suggested minimums. The higher the R-value, the better the insulations.

Source: Energy Information Handbook, IFAS, Center for Environmental and Natural Resources.

The Home Energy Saving Book by Shelldon Labert, Shell Manager of Energy Economics.

CHOOSING THE PROPER AMOUNT OF INSULATION (Tape #107)

Because of Florida's milder climate, it is not necessary to insulate a house as much as in other parts of the country. The amount of insulation you need depends on several factors. One important consideration is the R-value of the material you use. The higher the R-value, the lower the amount of material needed. Another consideration is the thermal effectiveness of your house right now. And finally, the amount of insulation you add, will depend greatly on the amount of money you are willing to spend and how long you plan to live in your home, after adding insulation.

Source: Energy Information Handbook - C.N.R.P.
Reprint Sept.'78 Dimensions/NBS
"Insulation Insomnia: A Cure!"

TIPS OF ADDING INSULATION (Tape #108)

When you add insulation, start with your attic, especially if you don't intend to insulate your entire home. You could save up to twenty five percent on your cooling and heating costs, just by insulating your attic or top floor ceiling.

When you install insulation, be sure to wear gloves, a breathing mask and a loose fitting long sleeved shirt, and be certain to read and follow the manufacturer's recommendations for proper installation.

And while you are considering your insulation needs, don't forget the water heater. There can be significant heat losses from the hot water storage tank and supply lines.

Source: Energy Information Handbook by (ENRP)
Energy Workbook #2 by New York State Energy Office.

WHAT DOES THE TERM R-VALUE MEAN? (Tape #109)

R-value is a number which indicates the ability of a material to decrease the flow of heat. This is the single most important indicator of the effectiveness of insulation. R-values should be used by the homeowner in deciding what insulation to buy. The higher the R-value, the more effective the insulation, regardless of the type or thickness of the material. You can always relay on the R-value to tell you how much insulation you're getting for your dollar.

Source: "Insulation Insomnia: A Cure!" September 1978, Dimension/NBS

TYPES OF STORM WINDOWS (Tape #110)

Storm windows are available as a removable singletrack storm sash with a single thickness of glass or plastic. Another type of storm window is a combination storm unit (it can be double or triple track) with a screen for summertime ventilation plus two panels of glass or plastic that can be moved up and down in tracks in the storm window frame.

Source: Clark University, Energy Phone Operators Manual #310

STORM DOORS (Tape # 111)

You can reduce heat transfer through doors by installing a storm door. A wooden storm door that is one half windows can reduce heat transfer through the door by 45 to 50 percent. A metal storm door, no matter how much glass it has, will reduce heat transfer by only 30-35 percent. However, storm doors may not always be a good investment. If you plan to use them only for winter heating savings, consider how frequently you use the door, when storm doors are used in both seasons with interchangable glass and screen inserts, they may be a good investment.

CHOOSING CAULKING MATERIAL (Tape #112)

There are three basic types of caulking materials. Those with an oil or resin base, those with a latex, butyl or polyvinyl base and those of the elastomeric group. Both oil and resin base caulking materials are readily available. They have a life expectancy of five to ten years. Oil or resin base caulking materials will bond to most surfaces. They are the least expensive and have a tendency to shrink, become brittle and fall out.

The second type of caulking materials are the latex, butyl, or polyvinyl based compounds. They are more durable and expensive than oil or resin caulks. The lates and butyl compounds offer good resistance to weather and have a life expectancy of roughly ten years.

The third type of caulking materials, the elastomertic caulks, are the most durable and the most expensive. This group includes silicones, polysulfides and polyurethanes. These materials offer excellent weather resistance and will last 20 years or longer. Some caulking compounds are tinted to match various house stains. However, most people still use caulks that are white, light gray or tan. Keep in mind that caulking componds rangein price, and you usually get what you pay for.

Source: North Carolina Teletip #4123

BUYING WEATHERSTRIPPING (Tape #113)

When weatherstripping windows there are several materials you can choose from. They include plastic or rubber weatherstripping with an adhesive backing, rolled vinyl weatherstripping and spring metal. The plastic foam with adhesive backing is easy to install and should be used in press-fit situations. It sticks well to clean wood or metal. However, it is not very durable. Rolled vinyl is installed using tacks or staples. It is visible when installed and comes with or without metal backing. Rolled vinyl is considered easy to install and is very durable. Spring metal weatherstripping is installed in the channel of the window frame so it is virtually invisible. It is a little more difficult to install but it is considered quite durable. It can also be applied around a door frame. You'll also have several other methods and materials to choose from when weatherstripping doors. Around the top and sides you may use adhesive backed foam, rolled vinyl with aluminum channel backing, foam with wood backing which are easy to install, spring metal interlocking metal channels, and fitted interlocking metal channels, often referred to as J-strips are more difficult to install. To seal the threshold use a sweep and a vinyl bulb threshold, a door sweep in combination with a vinyl bulb threshold makes an efficient draft stopper.

WEATHERIZATION FOR RENTERS (Tape #114)

A renter may suffer if the landlord doesn't care about making his property energy efficient. But all is not lost. There are several no and/or low cost ideas that you as a renter can use to decrease your energy bills. For example, one of the sources of heat transfer in any home is air infiltration. This can be reduced by weatherstripping and caulking. Since these materials are inexpensive you may save money by installing these materials, especially if you plan to stay at the place from one to two years. Of course, you'll want to get approval from your landlord first. Cracks under doors cause a tremendous cooling and heating loss, and can be stopped by constructing a draft stopper. This is a long, snake-like piece of fabric that's been filled with sand and placed in front of the door. Another thing you might do is use plastic storm windows, that is, if conventional storm windows are

not present. You can place plastic storm windows on the inside or the outside of the windows. Plastic storm windows will normally pay for themselves in one year. But take care not to damage the rental property when using these methods. Thermostat setback will make a significant reduction in your cooling and heating bills. Insulating shutters that fit over patio doors and windows can make a difference in house or apartments that have large areas of glass. Finally, keep in mind that common sense will give you some of the best clues to saving energy.

INSULATE YOUR WATER HEATER AND SAVE FUEL (Tape #115)

Now you can buy for your home water heater an insulation refit kit which can save both money and fuel. The kit consists of a blanket of fiberglass insulation and comes with do-it-yourself installation instructions. The additional insulation on the water heater reduces the rate of heat loss, which also reduces the energy required to keep the water at the controlled temperature. Studies in 1968 show that on a national average, the use of the kit would save $5 to $20 per year on your utility bill and would repay your initial investment (under twenty dollars) in energy savings within fifteen months for electric water heaters and within three and a half years for gas water heaters. A refit kit can be used safely on electric water heaters and on gas water heaters when installation instructions are followed carefully. The refit kit will also outlast the water heater tank and can be reused on a new one. You can cut heat loss by about four hundred kilowatt hours per year for electic water heaters and by about 3600 cubic feet per year for gas water heaters with one and a half inches of additional insulation. Instead of buying a refit kit you may find it more economical to buy blanket type insulating material to wrap around the tank of an electric water heater. But buying blanket type insulation material is not recommended for gas water heaters, for safety, use only the refit kit if you have a gas water heater.

Insulating hot water pipes should be done to reduce the amount of heat loss from the pipe surface. This will keep your hot water hotter. You can get specially made kits at any hardware store or building supply store. You can add insulation around your hot water heater if it is inadequately insulated, but be sure not to block off needed air vents. That would create a safety hazard, especially with oil and gas water heaters. When in doubt, get professional help, and remember, heating water accounts for about 26% of all the energy used in the average home and 3% of all energy used in the United States.

Source: Insulate Your Water Heater and Save Fuel.

REFLECTIVE WINDOW FILM (Tape #116)

In recent years, reflective window film treatment has been showing up almost everywhere - - on the windows in office buildings, on campers and cars, and most recently on residential windows. Reflective film has proven to be a

big energy saver. It reflects the sun's heat away from the windows in the summer and also may reflect some of the heat created inside, back into the room in the winter. The reflective quality is achieved through the application of a bronze, gold, or silver-colored film to the inside window surface. Sun control film is available in several degrees of reflectiveness. People who don't like the mirror effect, can choose a film referred to as fifty percent. Fifty percent film has a slightly smokey look and possesses enough reflective qualities to make a real difference. There is also an intermediate version of reflective film called 65 percent. However, the bronze film from some companies reflects up to 80 to 85 percent. Remember, the larger the percentage the greater the energy savings. Film is available in silver or bronze colortones with densities ranging from 50 to 85 percent. Another sun control film has been shown to reduce window heat and glare by as much as 75 percent under ideal conditions. Covering a ten foot by ten foot sun facing window area, with this film can have a cooling effect equal to about one ton of air conditioning.

REFLECTIVE FILM INSTALLATION (Tape #117)

There are several brands of solar control film that homeowners can install themselves, and still get professional results.

Installation may vary from product to product, but the following step by step guide shows how easy the job can be. First you need some tools for the installation. These tools include a rubber squeegee, a spray bottle, a metal straight edge, a utility knife and some paper towels. A relatively inexpensive tool kit with everything you'll need is also available. Here's how to install the film. All work is done on the inside surface of the window. The first step is to mix one teaspoon of liquid dishwashing detergent and one pint of water in a spray bottle. Next, spray the inside surface of the window with the solution. Wipe it dry with a paper towel to be sure the window is clean and free of grit. The third step is to cut the piece of reflective film so that it is about one-fourth to one-half of an inch bigger than the window. Next, put tabs of masking tape on both sides of the reflective film, One tab at each corner, Don't let the sticky sides of the tape touch each other. Then spray the glass with water until it is thoroughly wet. Separate the film from its backing by pulling the tape tabs at the corners. Spray the sticky side of the film with water as you peel away the backing. Be sure to wet the entire surface of the film. Then place the sticky side of the film against the glass and slide it around until it is properly positioned. The wet film slides easily against the wet glass. When the film is in position, spray the back side of it with water to provide lubrication for the squeegee. Next, starting in the center, work the water from the film by making both vertical and horizontal strokes with the squeegee. Don't worry about tiny bubbles or haze, they'll disappear in a few days. Don't press the squeegee down along the film's edge until after you trim the film. You may want to wrap a paper towel around the squeegee to absorb any surface water. Finally, using the utility knife and straight edge, trim the film within about one-sixteenth of an inch from the edge of the pane. Squeegee the edges of the trimmed film.

INSTALLING PLASTIC ON WINDOWS (Tape #118)

Storm windows reduce the amount of heat transfer through windows by fifty percent. Storm windows can be made out of may different materials, including plastic and glass. Both these materials offer the same protection to the homeowner so far as heat transfer is concerned. Plastic can be placed on either the inside or outside of the window. Several methods of installation may be used. For example, if screens are already present over the windows, remove the screens, cover with plastic and replace. The plastic cover offers a good seal and gives a storm window effect. Frames made out of one inch or one inch by two inch lumber can also be made to fit the size of a window opening. Just staple or tack plastic directly to the outside frame of the window. You'll probably need to put thin pieces of wood or cardboard between the plastic and the tack. Plastic can also be placed on the inside of the window. Just cut the plastic to the desired size and tape it to the wood frame. Masking tape or freezing tape work will except when it is left in place for a period of months it may become very dry and difficult to remove. Keep in mind that putting plastic over your windows will reduce your ability to get out of these window quickly in case of an emergency. Plastic can be purchased in window kits or it can be purchased in large rolls that you cut ot the desired size. Keep in mind that the tighter you apply the plastic, the neater your job will look and the less likely that it will be disloged by stong winds.

Source: North Carolina Teletip 4147

WHERE TO INSULATE (Tape #119)

Proper use of insulation in a house, apartment or mobile home is one of the most effective ways to reduce the cost of cooling and heating. Insulation should go between the attic and the roof, if the attic is finished. If you have an unfinished attic, you should inslulate between the ceiling and the unfinished attic. Another important place to insulate is between the floor and either the crawl space or unfinished basement. All exterior walls, including those next to an unheated garage, should be insulated. The idea is to have the entire living area enveloped by insulation material.

Source: Energy Information Handbook by The Center for Environmental and Natural Resources, University of Florida.
"You Don't Have to Live in the Dark To Lower Your Eclectic Bill" by Gainesville/Alachua Co., Regional Electric, Water & Sewer Utilities Board, Energy Savers Catalog by the Editors of Consumer Guide.

FORMS OF INSULATION (Tape #120)

Insulation comes in four forms. They are batts, sometimes called blankets, loose fill, foam and ridgid board.

Batt or blanket insulation usually comes in rolls of different lengths. Both batts and blankets are sold in widths of 15 or 23 inches to fit most framing spaces. The thickness of batts or blankets is usually 1 to 7 inches. Batts and blankets can be bought with or without vapor barriers.

The loose fill form of insulation comes in bags and is meant to be poured or blown on attic floors or into wall spaces.

Foam type loose insulation can be installed only by a contractor. Special equipment is needed to install this insulation.

Rigid board insulation comes in nonflexible sheets of dirrerent sizes and thicknesses.

Source: Energy Information Hand Book, IFAS

SELECTING STORM DOORS (Tape #121)

There are at least five things you should think about when buying storm doors - - they are the door finish, corner joints, weatherstripping, hardware quality and construction materials. For the door finish, a plain aluminum finish will oxidize, reducing ease of operation and degrading appearance. A baked enamel finish is better. When considering corner joints, keep in mind that quality of construction affect strength and performance, The corners should be strong and air tight. If you can see through the joints on a storm door, they will leak air. Storm doors are supposed to reduce air leakage around your doors. Weatherstripping quality can make a big difference in how well your storm doors perform. So compare several types of weatherstripping before you make your final choice. Keep in mind that the quality of locks and catches will have a direct effect on durability and therefore overall construction. You can buy storm doors of wood or steel within the same price ranges as aluminum storm doors. The choice between doors of similar quality but different materials is a matter of personal taste. You can save a few dollars by installing storm doors yourself. But it will probably be easier to have the supplier install the storm doors for you, unless you have a lot of handyman tools and plenty of skill. Installation should take less than half a day. Make sure installation is done properly. Check to be sure doors operate smoothly and close tightly. Check for cracks around the jamb and make sure the seal is as air tight as possible. If the door has exchangeable window and screen panes, make sure all panes fit properly and offer a weather-tight seal.

Source: Teletip

WHY WEATHERSTRIP? (Tape #122)

Energy loss through windows and doors may account for a large percentage of your total energy loss. Losses occur through the processes of conduction,

radiation, air infiltration and air exfiltration. Weatherstripping can help solve two of these problems, air infiltration and air exfiltration. Air infiltration is the unregulated and unintentional entry of air into the living space of your house through cracks, holes, and other openings in the outer shell of your house. Air exfiltration is air exiting through those same openings. There are simple tests to determine if air is infiltrating around windows and doors. You can feel for air leaking in by placing your hand on several places along door and window cracks. Also you can shine a flashlight along door and window edges from the outside at night while someone inside watches to see if the light get through. Weatherstripping and caulking play an important part in reducing infiltration and exfiltration. Weatherstripping is usually used to seal cracks in moving parts of doors and windows. Caulking is usually used to close joints between two fixed parts of the house, such as between window casings and siding.

Source: Energy Phone Operator's Manual, Clark University
Science, Technology and Society Program, Fact Sheet 300

WEATHERSTRIPPING A WINDOW (Tape #123)

Weatherstripping windows can greatly reduce air infiltration. Weatherstripping a double-hung wood window can reduce air infiltration by 38%. For metal double-hung windows a 60% reduction is possible. Latching a weatherstripped window can further cut infiltration by 17%. There are six basic types of windows in home use. The double-hung window is the most common window. Horizontal sliding and jalousie type window may be hard to seal. Casement windows are easy to seal while hopper and awning windows are installed below fixed glass. There are several terms you should be familiar with before weatherstripping a window. The window sash is the movable part of a window. The window sill is the horizontal piece forming the lowest member of the window frame, and the window casing is the enclosing framework around a window. Two materials are commonly used for weatherstripping double-hung windows. The are spring metal, and pliable gasket weatherstripping. Spring metal works best on double-hung sash windows. It is durable and hidden from view when the window is closed. Pliable gasket weatherstripping includes tubular vinyl or felt clinched in a flexible aluminum reatainer. It is attached to the outside of the window frame. It's not visible from the inside and it's easier to install than spring metal. No weatherstripping is made specifically for home installation on sliding metal windows. However, the manufacturer's weatherstripping usually consists of a bead of felt, vinyl, or neoprene in a molded channel. For wood windows, one possibility is pliable gasket weatherstripping where you weatherstrip as a double-hung window if both sashes on the window move. Also spring metal may be installed in the channel where the sash closes against the side of the frame. Wood casement windows are weatherstripped in three sections. The first section includes the sides and top. Section two is the bottom of the window and section 3 is the bottom sill. One of the more durable materials, such as tubular vinyl, is suggested for use on the windowsill and the bottom of the window. There are several materials available for use on the top and sides of windows. Among these, felt weatherstripping is one of the least expensive. Felt weatherstripping comes in a variety of widths and thicknesses. Another fine material is tubular vinyl. This material is inexpensive and easy to install. You can use it on hard-to-seal areas, and even loose windows. It is also very durable.

SELECTING STORM WINDOWS (Tape #124)

There are at least four things you should think about when buying storm windows, they are, the frame finish, corner joints, sash tracks and weatherstripping, and hardware quality. Let's take a closer look at each of these starting with frame finish. A plain aluminum finish will oxidize, reducing ease of operation, and degrading appearance. A baked enamel finish is better. Next, we will consider corner joints. Keep in mind that quality of construction affects the strength and performance of storm windows. So check the corners. They should be strong and air tight. Normally overlapped corner joints are better than mitered ones. If you can see through the joints on a storm window, they will leak air. Storm windows are supposed to reduce air leakage around windows. The depth of the metal grooves at the sides of the window and the quality of weatherstripping will make a big difference in how well storm windows do this. Compare several types before making your choice. Finally, the quality of locks and catches has a direct effect on durability and is a good indicator of overall construction quality.

CHARACTERISTICS OF BLOWN-IN INSULATION (Tape #126)

There are two forms of blown-in insulation materials. They are loose fill materials and foams. The three main materials used for blown-in insulation are cellulose and mineral wools, both loosefill materials, and urea-formaldehyde foam. Loose fill materials can be blown-in in the attic or side walls of your house. These materials are installed by blowing the insulation through a big flexible hose into the space to be insulated, using air pressure. A major disadvantage of using loose fill blown-in insulation is that you sometimes get settling if the material is blown in too lightly. Foam is also a good material to use for retrofitting older homes, and for filling hard-to-reach places. However, foam is not recommended for use in attics. Ureformaldehyde foam is a mixture of resin, foaming agent, water, air and a hardener. Cured foam looks very much like dryed shaving cream. This foam must be installed by a contractor using special equipment. Using urea-formaldehyde foam has a few disadvantages. First, as the foam dries, it gives off a small amount of formaldehyde gas. If the foam is not made up correctly it will give off formaldehyde gas even before it is dry. Another problem with foam is that it may shrink as much as eight percent. So if you decide to use foam, remember to shop around carefully for a qualified contractor.

Source: Energy Phone Operator's Manual, Clark University
Science, Technology and Society Program, Fact Sheets #221,225,241

ENERGY SAVING WINDOW COVERINGS (Tape #127)

Windows are especially vulnerable to heat transfer. In most parts of Florida, heat gain in the summer is even more important than heat loss in the winter. Approximately 25 to 30 percent of a home's heating and cooling costs may occur because of poor window insulation. Energy transfer at windows may be reduced by blinds, shades, draperies or shutters. Shades help to reduce the effects of incoming solar heat in the summer.

Approximately 15 to 20 percent of a home's heat gain through windows is reduced if materials are selected carefully. Light colored opaque vinyl fabrics save energy, these fabrics reflect heat. Consider how opaque the vinyl fabric is before making any purchasing decisions. The more opaque the vinyl, the darker the room will become. During the summer months, shades or curtains can be lowered in the daytime to keep solar heat out. This will help reduce air conditioning bills and increase the life of home furnishings. At night, shades can be raised to take advantage of natural air currents. Ceiling to floor draperies reduce air flow better than short draperies. Also remember that short draperies with the tops blocked off are better than free hanging ones. Layered window coverings are very flexible and provide more inslulation. In the summer, they help to keep solar radiation out, and can also be opened in the evening to take advantage of natural air currents.

Tighter weave fabrics prevent more heat transfer than loosely woven fabrics. For this reason tighter woven fabrics are better for use as window coverings than light weave fabrics.

WHERE AND HOW TO CAULK (Tape # 128)

You should caulk wherever two different materials or two parts of the house meet. Estimating the number of cartridges of caulking compound you'll need is not easy, since the amount needed will vary with the size of the cracks to be filled. But rough estimates are: a half cartridge for a two-story chimney. You might want to start your job with a half-dozen cartridges and get more as needed. It doesn't take much skill to apply caulking. But before you start, you'll need to clean up the area to be caulked. Remove paint build-up, dirt or old caulking materials with a caulking solvent, a putty knife or large screwdriver. Drawing a good bead of caulk may take a little practice, but whatever you do, make sure the bead overlaps both sides for a tight seal. You can fill extra wide cracks, like those where the house meets the foundation, with oakum, glass fiber insulation strips or similar materials. In those places where you can't quite fill the gaps, finish the job with caulk. Caulking compounds also come in rope form. You can fill extra long cracks easily this way. Just unwind the caulk compound and force it into cracks with your fingers. There are a variety of places where you should caulk. For example between the tops of windows and siding and at joints between door frames and siding. Caulking is also recommended between window sills and siding, at corners formed by siding, and where wood structure meets foundation. You can caulk outside house surface. Caulking should be done between porches and the main body of the house, where pipes and wires penetrate the ceiling below an unheated attic, and where storm windows meet the window frame, Remember caulking and weatherstripping could reduce your family's energy costs by 10% or more.

Source: Extension Teletip

WINTER WEATHERIZATION FOR RENTERS (Tape #129)

A renter may suffer if the landlord doesn't care about making his property energy efficient. But all is not lost. There are several no cost and/or low cost ideas that you as a renter can use to decrease your energy bills. For example, one of the main sources of heat loss in any home is air infiltration. This can be reduced by weatherstripping and caulking. Since these materials are inexpensive you may save money by installing these materials, especially if you plan to stay at the place for one to two years. Of course, you'll want to get approval from your landlord first.

Cracks under doors cause a tremendous heat loss and can be stopped by installing a metal and vinyl bottom strip to teh lower edge of the inside of the door. The vinyl part seals the door/floor gap. The strip is extremely durable and easy to install.

Another thing you might do is use plastic storm windowm that is, if conventional storm windows are not present. You can place plastic storm windows on the inside of the windows. Plastic storm windows will normally pay for themselves in one year. But take care not to damage the rental property when using these methods.

Thermostat setback will make a significant reduction in your heating bill, unless you have a heat pump.

Insulating shutters that fit over patio doors and windows can make a difference in houses or aprtments that have large areas of glass.

Shutters are designed to attach easily to windows or doors and can be removed during daylight hours. They can be replaced at night when heat loss is greatest. And keep in mind that common sense will give you some of the best clues to saving energy.

Dressing warmly, restricting the use of exterior doors to a minimum, and adjusting your lifestyle to accommodate lower temperatures, can help to reduce your heating bill.

INSTALLING BATT AND BLANKET INSULATION (Tape #131)

Observe safety rules when installing insulation. For example, when you're working in the attic provide good lighting, lay boards or plywood sheets over the joists or trusses to form a walkway and working surface, and look out for nay roofing nails that might be poking through the roof sheathing. If you're installing insulation during warm weather, try to do it is the coolest part of the day. Attic temperatures can reach over 140 degrees F. and always wear gloves and a breathing mask. Keep in mind that vapor barriers should always be placed next to the living area. If you're adding new insulation over old, and the new insulation has a foil or paper vapor barrier, slash the foil or paper at frequent intervals. This helps prevent moisture from being locked in. Place ceiling insulation over the top of the outside walls. Use a baffle to insure air space between the insulation and the underside of the roof deck. Also, do not block eave vents.

Install floor insulation with the vapor barrier next to the floor. Floor insulation may be supported by wires called insulation supporters. Here are two important safety reminders. Keep combustible insulation materials away from chimneys. We recommend using unfaced batts or blankets near chimneys and never place any type of insulation within three inches of a recessed lighting fixture.

TYPES OF STORM DOORS (Tape #132)

There are two main types of storm doors. The aluminum storm door is light, easy to install and generally inexpensive. It is available in a variety of colors and designs. It can be custom-made to fit any openings. Most aluminum storm doors have interchanbeable screen and glass panels.

Wooden storm doors can be custom-made to fit any opening. This type of storm door does not have a self-storing screen as aluminum doors have so they are not quite as versatile. You must install the screen or window panel separately and therefore need more maintenance.

Most storm doors have an automatic closer which means that the entry is never totally open for very long.

QUALITY OF ALUMINUM STORM WINDOW (Tape #133)

The quality of aluminum storm windows is based on the following criteria.
The gauge of the metal. The thicker the better, also the more expensive the window.
The amount and type of weather stripping on the window. The type of finish you choose will have an effect on both the quality and price of your strom windows. The most expensive finish is a colored finish. The moderate priced finish is an anodized or chemically treated finish. The least expensive and least durable finish is a mill finish. This is simply raw aluminum.

Check the quality of the hardware used on the window. Also see if the window has tie bars. These are horizontal bars screwed to the window for strength.

Always examine closely the way the window was constructed. Are the joints strong, do corner joints overlap, is the glass firmly in the frame? And finally, always check the period of warranty for materials, workmanship finish and construction.

TYPES OF INSULATION AND THEIR R-VALUES (Tape #135)

There are many different types of insulation available to-day. Fiberglass is material made of finespun threads of glass. It is relatively inexpensive and comes in many forms. Fiberglass batts or blankets are commonly used forms and have an R-value of about 3.2 per inch. Fiberglass can also be blown in;

however, the R-value of blown fiberglass is only about 2.2 per inch.
Rock Wool is another synthetic mineral fabric which looks like and has most of the same properties as fiberglass and it comes in a loose fill form for blowing in. The loose fill rock wool has an R-value of about 2.9 per inch while batts or blocks of rock wool have an R-value of 3.2 to 3.7 per inch.
Cellulose is a chemically treated woodpulp or shredded paper. It comes in rolls, batts or loose fill. Cellulose has an R-value of 3.2 to 3.7 per inch which is higher than either fiberglass or rock wool. Also, cellulose will not irritate the skin like fiberglass and rock wool.
Vermiculite is a loose, lightweight material. It has an R-value of 2.04 to 3.0 per inch. Vermiculite can either be pored or blown into spaces that need insulating. Vermiculite is a very popular home insulating material because of its low cost, wide distribution and easy installation.
Perlite is a material very similar to vermiculite. It has almost all the same properties as vermiculite but has an R-value of 2.5 to 3.7 per inch which is somewhat higher than vermiculite.
Polystyrene which is commonly called styrofoam is an excellent insulating material for exterior walls around slab foundations. It comes in molded boards which have an R-value of 3.85 to 4.35 per inch. It also comes in expanded boards, these boards have an R-value of 5.0 per inch. All forms of polystyrene are moisture resistant and highly combustible.
Rigid Board Polyurethane is very similar to polystyrene but has an R-value of 5.2 to 7.8 per inch. In fact rigid board polyurethane has the highest R-value of any insulating material. However, it is not suited for retro-fitting and should not be used by do-it-yourselfers.
Urea-Formaldehyde is the last type of insulation material we will talk about. This is a foam type of insulation that has an R-value of 4.2 to 4.5 per inch. Urea-Formaldehyde is fire resistant as well as soundproof. However, it cannot be installed by the do-it-yourselfer. Recently this material has been banned in several states because of it's possible health hazard.

LOWERING THE TEMPERATURE OF YOUR WATER HEATER (Tape #200)

Setting the thermostat on your water heater is a very simple procedure. The first and most important step is to turn off the electricity to the water heater at the fuse box. After shutting off the electricity, remove the access panel to the water heater. Some water heaters have two thermostats so check the owner's manual for your water heater before beginning. Next, seperate the insulation carefully so you can see the thermostat. Using a small screw driver, turn the thermostat pointer to the temperature you want. Now, put the insulation back where it was originally and replace the access panels. Finally, turn the electricity on at the fuse box.

Source: "You Don't Have to Live in the Dark to Lower Your Electric Bill." Alachua County Regional Utilities.

WHAT DOES E.E.R. MEAN? (Tape #201)

The letters E.E.R. represent the term Energy Efficiency Ratio. This is a number which rates the energy efficiency of similar appliances. The higher the E.E.R. number, the more efficient the appliance. For example, room air conditioners can have E.E.R.'s as low as 6.0 and as high as 12. The room air conditioner which is rated at 12.0 is about twice as efficient as the 6.0 rated unit of the same capacity, and it uses less than half of the electrical energy.

Source: Tips for energy savers -- U.S. Department of Energy.

KEEP COOL WHILE YOU SAVE MONEY (Tape #202)

Keep doors and windows firmly shut and locked to cut down heat gain in summer. Check your windows and door latches to see whether they fit tightly and, if necessary, adjust the latches and plug any air leaks.

The tightest door in the world doesn't work when it's open, so try to cut down the number of times that you go in and out. Adding a vestibule to your front and back doors will also help to tighten up your house.

One alternative to energy-consuming air conditioning is the use of a ceiling or window fan to cool your home when the outdoor temperature is 82^0 F or less. Normally a house holds heat. The purpose of a fan is to speed up the cooling of the house, by pulling air in through open windows, up through the attic and out, or out through the window.

The size of the fan you buy should be determined by the amount of space you want to cool. You can figure out the fan size you need by finding the volume of you house: Rounding off to the nearest foot, multiply the length of your house by its width, then multiply by its height (from the floor to just below the attic). This will give you the volume in cubic feet. The capacity of all fans is marked on the fan in CRM's -- that is Cubic Feet of air moved per Minute. Multiply the volume of your house by 30. Then divide your answer by 60 -- this will give you the CFM rating of the fan you will need to change the air in the house 30 times an hour.

A good way to keep your house cool in the summer is to shade it from the outside. The east and west sides are where the most heat comes through -- if you can shade here, it will show up right away in a smaller air conditioning bill and a cooler home.

Trees and vines that shade in the summer and lose their leave for the winter are what you want; they'll let the sun back in for the cool winter months.

If you can't shade your house with trees, concentrate on keeping the sun out of your windows --awnings, sun shutters, sunshade or the installation of sun control films on the east and west window will help do the job.

ENERGY SAVING LAUNDRY TIPS (Tape #203)

Almost four percent of the energy you consume in your home is used for operating your washer and dryer. This does not include the energy it takes to heat water used to wash clothes. You can save a good deal of energy on laundry by washing clothes in warm or cold water, rather than hot water. The energy used to heat one hot water wash could power fifty cold wash cycles. When using a washing machine, don't overload it. Use the recommended amount of detergent. Another way to save energy and avoid having to wash things twice is to pre-soak heavily soiled clothes. You can also save energy by drying your clothes outdoors, on a clothesline. But, if you want to yse your automatic dryer, here are a few tips on saving energy:

-- Fill the dryer, but don't overload it
-- Clean the lint screen after drying each load
-- Check the outside exhaust of your dryer regularly, and keep it clean
-- Dry your clothes one load after the other, without letting the dryer cool off between loads.
-- Remember, heavy clothes take longer to dry so dry them together, and dry light weight clothes in a separate load.

Source: Tips for Energy Savers/Use, Home Energy Management Survey/IFAS
Energy Information Handbook/CENRP/IFAS

HOW TO SAVE GAS AND MONEY (Tape #204)

You can easily cut your gas use by about forty to eighty gallons per vehicle each year, by simply driving more efficiently. Here are a few gas saving tips:

-- Drive at a moderate speed. Most cars get around twenty-five percent more miles per gallon when driven at fifty miles per hour, rather than seventy miler per hour.
-- Start acceleration slowly. Hot rodding and jerky acceleration can cut your gas mileage by as much as ten percent.
-- Try to avoid unnecessary braking by driving defensively and by anticipating the traffic ahead.
-- Drive at a steady speed when traffic allows. Repeatedly varying your speed by five miles per hour or more can cut gas mileage as much as one to two miles per gallon.
-- Shift into high gear as soon as possible. You can use as much as forty-five percent more fuel by racing along in second gear rather than shifting into high gear.
-- Don't idle your car any longer than you have to. The average American car uses a cup of gas for every six minutes that it idles. Remember it takes less gas to restart a car than it does to let the car idle.
-- Use your air conditioner sparingly
-- Combine trips to the market, library, school, or to visit friends. You'll find that one trip can serve two or three purposes. Avoid short trips whenever possible.

-- One final suggestion. Use public transportation whenever possible. Public transit saves you money, time and wear and tear on your car and yourself.

Source: "How To Save Gasoline . . . And Money". State Energy Office (DOE)
"Good Driving Habits Conserve Energy". State Energy Office (DOE)
"Don't be Fuelish". U.S. Office of Energy Conservation and Environment (FEA)

KITCHEN ENERGY SAVERS (Tape #205)

There are many ways to cut down on the energy you use for cooking, and most of them are no cost steps. Use pressure cookers and microwave ovens if you have them. They save energy by reducing cooking time for many foods. Use range-top rather than the oven whenever you can and always try to match the size of the pan with the size of the burner. When preparing a small amount of food, use small electric appliances rather than the kitchen range or oven. When cooking with electricity, get in the habit of turning off the cooking element several minutes before you're finished cooking. Use a kettle or covered pan to boil water, it will come to a boil faster and use less energy. Avoid opening the oven door when you're preparing food. Watch the clock or use a timer instead to see if your food is done. When you use the oven, cook several things at one time. Prepare dishes that can be stored for later use. If you have a garbage disposal, always use cold water, to operate it. Also use cold water to rinse your dishes.

Source: Tips For Energy Savers - U.S. DOE

LOW COST IDEAS TO HELP CONSERVE ENERGY (Tape #206)

Here are several low-cost ideas that can help you cut your home fuel bill, and perhaps live more comfortable. Seal the cracks around the windows and doors with caulking and weatherstripping.

Cover you windows. If storm windows are to expensive, use plastic. The plastic can be attaced to the window frame, taped to the window screen, or put in a separate frame made for the window. You can tape the plastic directly to screen doors.

You can make a "draft stopper" if your doors do not fit tightly at the bottom. Your draft stopper can be as simple as a towel or scatter rug shoved against the crack at the bottom of the door. Or you can make a draft stopper by sewing together a tube make out of close weaved fabric. Once you make the tube, fill it with sand and place it against the cracks in your door.

Another thing you can do to reduce your fuel bill is to enclose the foundation or crawl space around your home. Use plastic, siding, or roofing or other material to prevent wind from blowing under the floor. One caution though. If you completely seal your crawl space, check it periodically to see if it is beginning to feel damp. If it does, ventilate the crawl space to reduce moisture. Also use the attic fan in the summer. Finally, inspect and clean the cooling system regularly and replace filters ofter.

Source: Teletip.

NO COST ENERGY TIPS (Tape #207)

About 50 percent of the energy used in homes is used to heat and cool your home. The second biggest home energy expense, another 26 percent goes for heating water. The remaining 24 percent goes into cooking, lighting and running appliances.

You can cut your energy use and living expenses by making your home more energy efficient. Here are some energy saving tips that you can do without spending a dime:

-- Use cross ventilaion instead of the air conditioner whenever possible.
-- Set your hot water heater thermostat at 120° if you do not have a dishwasher.
-- Turn off the air conditioner and water heater when you are away from home for a day or more.
-- Take showers instead of baths, and use as little hot water as possible.
-- Use cold water to do laundry, whenever possible.
-- Dry your clothes outside instead of using a clothes dryer.
-- Keep air conditioning and heating turned off in unused rooms.
-- Keep window shades up in winter and down in summer, when using air conditioning.

SHOWERS OR TUB BATHS, WHICH SAVES MORE ENERGY? (Tape #208)

If you want to save energy when you bathe take a shower rather than a tub bath. Limit your showertime and check the water flow of your shower. It takes about 30 gallons of water to fill the average tub. But, a shower with a flow rate of 4 gallons per minute will only use 20 gallons of water for every 5 minutes you bathe. If you use half hot and half cold water when you bathe, you could save about 5 gallons of hot water everytime you take a shower rather than a tub bath. If just one member of your family substituted a shower for a bath each day, within one year you would save almost 2,000 gallons of hot water.

Source: Tips For Energy Savers -- U.S. DOE

ENERGY SAVING TIPS FOR UNDER $50. (Tape #209)

Almost 50 percent of the energy used in your home goes into heating and cooling the living areas. Another 26 percent goes for heating water, and the remaining 24 percent goes into everyday activities such as cooking, using small appliances and lighting you home. You can cut energy costs by making your home more energy efficient. You may have to spend some money to do it, but money you spend now, can help save you even more on your utility bills in the future. Some excellent energy saving ideas are:

-- Using an automatice night setback control on air conditioning and heating systems.
-- Apply weatherstripping and caulking where it is needed.
-- Use a flow restrictor showerhead, which allows a flow of 3 to 4 gallons per minute.
-- Consider energy efficiency when buying appliances, automobiles and power tools.
-- Keep your thermostat calibrated.
-- Dress to suit the season.
-- Use natural ventilation and fans whenever possible in summer.
-- Paint indoor walls light colors to decrease the need for excess lighting.
-- Repair leaky faucets.

Here are two more energy saving ideas. Keep your car engine properly tuned, and use public transportation whenever possible.

WHAT TEMPERATURE SHOULD MY WATER HEATER BE SET AT? (Tape #210)

It is important to remember that your water heater uses energy keeping your water hot even when you are not using it. So don't set your water heater higher than you need to. If you have a dishwasher 140 degrees is high enough, if not 120 degrees is enough. For every 10 degrees you reduce the hot water setting, you save more than six percent in water heating costs. If you reduce the temperature on your water heater from 140 to 120 degrees you can save as much as 18 percent on your heating bill each month. When checking the temperature of you water, use a thermometer. If you don't have a proper thermometer use a piece of hard candy. If the candy melts, the water is too hot.

Source: NYIT - Energy Tips 200 Ways to Save on Energy in the Home by George B. Roscoe and Family Circle, 4/22/80 "100 Energy Savers" by Jeffrey Blyth

USING A TIMER ON YOUR WATER HEATER (Tape #211)

Many people are starting to use timers on their electric water heaters. There are several different types of timers on the market, including some 24 hour units. The idea behind using a timer is to turn the water heater on only during the time you will actually be needing hot water. If you set the timer

to turn the water heater on for around four hours during the morning, there is usually enough hot water in the tank to last most of the day. However, you should adjust the timer so that the water heater is on during the time your family is involved in activities like washing clothes, or dishes, or bathing. By running your water heater only when you need hot water you can cut your electric costs by as much as 30 percent. Remember however, that you can also accomplish this savings without the use of a timer, by simply truning your water heater on or off manually. The two main advantages of using a timer on your water heater are convenience and eliminating the possibility that you might forget to turn the water heater on or off. Also remember you should always turn your water heater off when you're going to be away from home for a day or two.

Source: Homeowners Guide to Saving Energy by Billy L. Price and James T. Price, Tab Book/No. 904

SAVING MONEY ON YOUR COOLING COSTS (Tape #212)

Air conditioning used to be considered a luxury by most people. That's not true these days. Now, air conditioning is considered an essential part of summer life for millions of Americans. In fact, almost 33 percent of the total energy used in most homes in Florida is used for air conditioning. Here are a few tips on how to save money and stay cool at the same time. First, if you have air conditioning, make sure you are getting the most for your money when you use your system. For example, if you set your thermostat at 78 degrees instead of 72, you'll save around 30 percent on your cooling cost. When using air conditioning you should consider whether or not you really need it. Don't use your air conditioning when you could open the windows and use a fan to cool the house. Not everyone can afford an air conditioner. One solution to the discomfort of hot days without air conditioning is the use of fans and ventilators. For example, moving air at 85 degrees feels as cool as still air at about 78 degrees. The best way to achieve this cooling effect for your home is by installing wall fan and shutter units. These units cool the entire interior living space by pulling fresh air in through every window and discharging air through the attic. There is a whole house fan manufactured in the U.S. which has an automatic ceiling shutter. It is an easy-to-install, service free unit with cooling power that rivals air conditioning systems, while using much less electricity.

Another thing you can do to help keep cool and save money is to install reflective window film on all windows and sliding glass doors. It is a fact that covering a ten foot by ten foot sun exposed window area with certain window film materials can have a cooling effect equal to one ton of air conditioning.

UNDERSTANDING YOUR UTILITY BILL (Tape #213)

Next time you get a utility bill, spend a few minutes with it. Make sure you understand what the charges are for. Compare it with past utility bills to get an idea of your monthly use patterns. On your bill you will find an account number. Always use this number whenever you call about your bill or

about your service. The billing period tells you how many days you were billed for. The meter reading is used to calculate your electric bill. If your utility company provides more than one service, each service will be listed and a charge for that service will be shown. The next item is very important and that is the total amount you owe. Finally, you will find a statement or date that will tell you when your bill will be overdue.

Source: How to Understand Your Utility Bill, by U.S.D.O.E.
Various Utility Company Bills and the Company's Explanation to Customers of Their Bill.

HOW TO READ YOUR ELECTRIC METER (Tape #215)

There are two types of electric meters in use today. The dial meter and the digital meter. The most common type of electric meter is the dial meter. It has a series of four dials on the face of the meter. Each dial moves independently. The first dial on the right moves in a clockwise direction. The second dial from the right moves in a counter-clockwise direction. The third dial from the right moves in a clockwise direction, and finally the fourth dial from the right moves in a counter-clockwise direction. If you have a dial type meter, here are four simple steps you must remember when reading your meter. First, always begin by reading the dial on the right. Read each dial separately. Write down the last number which the pointer on the dial has passed, remember to check the turning direction of the dial when figuring this out. And finally, when the pointer is between two numbers, always read the low number. The second type of electric meter is the digital meter. This type of meter is much easier to read. The face of the meter has four window, with a number in each window. To read this type of meter simply read the numbers from left to right - by recording daily or weekly electric meter readings, you can see how effective your energy conservation actions are.

Source: Gainesville and Alachua County Regional Utility Board. "You Don't Have to Live in the Dark to Save Electricity".

BIG ENERGY USERS IN YOUR HOME (Tape # 216)

The biggest energy user in your home is by far the air conditioning system. However, in un-air conditioned homes the biggest energy user is the water heater. In air conditioned homes the water heater is the second most energy consuming item. On the average an electric water heater uses about 4800 kilowatt hours of electricity per year. This alone could account for almost 26 percent of your total electric bill. Another, almost 26 percent of your total home energy needs result from the use of all other household appliances. For example, the average 17.5 cubic foot frost-free refrigerator/freezer uses close to 2250 kilowatt hours per year.

If you have an electric clothes dryer in your home you can count on using about 1000 more kilowatt hours of electricity per year than a person who uses a simple clothes line.

When you use a room air conditioner to cool your house you will need 850 kilowatt hours of every 1000 hours you operate it. However, if you use an attic fan for cooling you might use only 290 kilowatt hours of electricity in an entire year. The last big energy user we will talk about is your television. The average solid state color T.V. uses 440 kilowatt hours of electricity per year. That is almost four times as much energy as a solid black and white T.V. so, when you consider that your water heater and household appliances can account for almost half of your total home energy needs, it makes sense to plan your hot water needs as well as your use of household appliances. Also remember to check the energy efficiency ratios of all appliances before you buy.

Source: Energy Savers Catalog by the Editors of Conserver Guide
200 Ways to Save Energy in the Home by George B. Roscoe
Home Energy Management Survey From IFAS

REFRIGERATOR/FREEZER ENERGY SAVING TIPS (Tape # 217)

In a typical home, the refrigerator/freezer is usually the greatest energy consuming appliance aside from the water heater and air conditioner. Here are some tips on reducing the energy consumed by your refrigerator/freezer. Avoid opening the doors on the refrigerator and freezer more often than necessary. Plan ahead and remove all items at one time. Don't maintain an excessively cold refrigerator or freezer. Usually a temperature setting between 38 to 40 degrees farenheit is sufficient for the refrigerator, while the freezer compartment should be about 5 degrees farenheit. Remember that frozen food helps retain the cold, so keep your freezer full. But don't put large amounts of unfrozen food into the freezer all at once. It will take longer for everything to freeze and will use more energy. Inside the refrigerator compartment, be sure to leave enough space for the air to circulate. This will insure even cooling and will eliminate the need for a colder temperature setting to make sure that everything is cool enough. Let the hot dishes cool slightly before putting them in the refrigerator, and remember, if you have a frost-free refrigerator make sure that all foods are tightly covered, so that the moisture will not cause the frost free system to work harder. When you go on a vacation, empty the refrigerator completely and turn it off. However, if you can't empty everything, remove the most perishable items and raise the temperature setting slightly. If you are buying a new refrigerator, you'll save energy if you buy one with a power-saver switch. By using the power-switch, you could save almost 16 percent in refrigerator energy costs. Another feature to consider when buying a refrigerator freezer is the frost-free option. Most frost-free refrigerator/freezers use almost one point six times more energy than manual defrosting models... However, if a manual defrosting refrigerator is allowed to have more than ½ inch of frost buildup before defrosting, the difference in energy use is lowered.

Source: Energy Savers Catalog by Editors of Consumer Guide
200 Ways to Save on Energy in the Home, by George B. Roscoe
Tips for Energy Savers by U.S.D.O.E.

DISHWASHER ENERGY SAVING TIPS (Tape #218)

A good dishwasher in proper running condition uses less water than hand-washing for the same amount of dishes. You can keep your dishwasher from becoming an energy waster. Here are a few tips on how to do it.
First use your dishwasher only when you have a full load. Save up a days worth of dishes if need be. Don't pre-rinse dishes. Scrape off all bits of food you can from the surface of the dishes before loading them in the dishwasher. Read the manufacturer's suggestions on loading the machine, and follow them. Also be sure to keep the filter screen free of food particles, this will cut down on residue in glasses and pots.

You can save a considerable amount of energy just by turning off the dishwasher and letting the dishes air dry.

Finally, be sure to use the right amount of detergent. The wrong amount or kind of detergent can reduce the efficiency of your dishwasher.

Source: Energy Savers Catalog by Editors of Consumer Guide.

OVEN AND RANGE ENERGY SAVING TIPS (Tape #219)

Your oven range is the second biggest energy consumer in your kitchen. The average electric range with a standard oven uses about 700 kilowatt hours of electricity per year. On the other hand, the average electic range with a self-cleaning oven uses 730 kilowatt hours per year, it is worth an additional 30 kilowatt hours a year just for the convenience of not having to clean your oven? No matter what style range and oven you have, there are several steps you can take to save electricity; first, if you have a choice, always try to use range top burners for foods that cook quickly, use the oven for cooking foods that will take a long time. Also, don't turn on the range top burner until the pan is on it, this will save energy and it is also a good safety measure. Never preheat your oven, unless it is absolutely necessary, if you have to preheat, be ready to put the food in just as soon as the oven reaches the necessary temperature, also, never preheat when broiling food. Another trick to remember when cooking is that cooking will often continue as much as five minutes after you turn off the electric element. Even with gas, food usually cooks for about a minute after you turn off the burner. Take advantage of your cookware to help save energy. For example, if you use copper or stainless steel cookware you need less heat than if you use aluminum cookware. However, the difference would probably not be great enough to warrant buying new pans. You can also lower your baking temperature setting 25°F when you bake with glass or ceramic dishes.

ENERGY SAVING TIPS FOR YOUR WASHING MACHINE (Tape #220)

Your washing machine uses both electricity and hot water. If it's not properly cared for, it can waste both. Here are four steps that you can take to make

sure your washing machine isn't wasting electricity or hot water. First if your washer has a water level control device, use it. Use the least amount of water you need to do the job. But be sure you don't overload the level you selected. Overloading will just make your washer work beyond its capacity. Also your clothes won't get clean, and may have to be re-washed. You should also clean the lint filter after every load and use the recommended amount of detergent. Oversudsing can overwork your machine. One final tip, always wash clothes made of similar fabric together, and remember to use the shortest washing cycle for the type of material involved. Also use the coldest water temperature that will get the job done. That means washing in cold water whenever possible.

Source: Energy Savers Catalog by Editors of Consumer Guide

CLOTHES DRYER ENERGY SAVING TIPS (Tape #221)

Here are a few tips on how to save money and still use your automatic clothes dryer.

First, run your dryer only when you have a full load, but never overload it. If your machine has a timer, set it for the least amount of time needed to do the job. Also if your dryer has a sensing control which shuts it off automatically when the clothes are dry, be sure to use it.

Always dry clothes of similar fabrics together. This will prevent over drying. Try to dry your clothes in consecutive loads so that the dryer doesn't cool off between loads.

Make sure you clean the lint filter after every load.

Finally, if you're going to iron something that will need to be dampened, don't dry it completely. This will save you both energy and time.

Source: Energy Savers Catalog by Editors of Consumer Guide

SAVING ENERGY, MONEY, AND YOUR CAR (Tape #222)

Good car maintenance and careful selection of accessories can save you wear and tear on your car as well as increase your gas mileage.

Here are some things you can do to keep your car in good shape and your gas bills down, before you ever get on the road.

Keep your car tuned up. Regular tune-ups improve your car's performance and increase the life of your engine.

Keep your engine filters clean. Clogged filters waste gas.

Use the gasoline octane and oil grade recommended for your car.

Check tire pressure regularly. Under-inflated tires cost you gas.

Consider buying radial tires next time you need new tires. They can mean from 3 to 5 percent improvement in city gas milage, and around 7 percent improvement in highway mileage.

Finally, remove all unnecessary weight from you car. An extra 100 pounds decreases fuel economy by about one to one and a quarter percent.

Source: Tips for Energy Saver - USDOE

FOOD PREPARATION - ENERGY SAVING TECHNIQUES (Tape #223)

Although cooking uses only a small portion of the total household energy, there are a number of ways to more efficiently use cooking appliances to save energy.

Whenever possible, use small portable appliances such as electric skillets and toaster ovens for cooking. Electric fry pan skillets have thermostatic controls that limit the amount of electricity to only the amount needed to keep the skillet at the pre-set temperature. The heat goes directly into the food and very little is wasted. Toaster or other small ovens should be used for small baking jobs. The range oven is a large user of electricity. Save it for large baking tasks so that the ovne is used for several items rather than one small one. Oven meals, such as cooking meat, potatoes, vegetable and dessert at the same time are particularly efficient.

When you use your range top, be sure to use pans that are near the same size as the element or burner so that heat goes into the pan not the kitchen. Pans that have straight sides, flat bottoms and tight fitting lids require less energy to cool the food. When you are cooking foods in liquids, bring the liquid to a boil at a high setting, then reduce the heat until the liquid is simmering. Simmering water cooks food as fast as boiling while using less energy. Keeping the pot covered means you need less liquid, the heat is kept in the pan rather than the kitchen and you loose fewer water soluable vitamins and minerals from the food.

Don't peak! Keep the oven door closed and the top on the pot! Much heat and energy are wasted by the cook's curiosity.

LEAKY TOILETS (Tape #224)

The cause of a leaky toilet can usually be traced to one of two problems. One cause of the problem could be the ball cock assembly which controls the amount of water that runs into the tank. The other cause could be the flush valve assembley, which controls the amount of water that flows from the tank into the bowl when the toilet is flushed.

The first step in locating the cause of a leaky toilet is to let the tank fill with water and then cut off the water entering the tank. If water continues to leak into the toilet bowl then your problem is a faulty flush valve. The stopper may not be aligned properly over the valve seat which permits water to leak past the valve and into the toilet bowl. You may be able to realign the stopper by adjusting the wire or bracket arm from which the stopper is suspended. The stopper itself could be faulty. If it is a ball-type stopper it may have lost its shape which means that it needs replacing. The valve seat itself may have become pitted and corroded, making a good seal impossible. If so, you can but a new valve seat as well as a new stopper.

In old tanks the overflow tube may have corroded where it joins the valve seat assembly. If so, water will continue to leak into the overflow tube and into the bowl even though the stopper and valve seat create a good seal.

If the flow of water into the toilet bowl stops when you cut off the water to the tank, your problem is likely in the ball cock assembly. The ball cock may not be cutting off the water as completely and as decisively as it should be. If this is the case, bend the float arm downward to allow greater pressure on the ball cock assembly when the water rises in the tank. When you bend the float arm downward you will also be lowering the water level in your tank. Therefore, flush the commode to make sure you still have enough water in the tank to do the job that it is supposed to do. Often the float ball becomes waterlogges because it has developed a leak. If so, buy a new one.

If you still have a problem after bending the float arm downward and, possibly, replacing the float ball, you may have to repalce the valve seat and valve inside the ball cock assembly. This can be done by removing two or three screws that hold the float arm assembly in place and removing the valve plunger from the top of the ball cock assembly. Take the valve plunger to a local hardware store and buy a replacement. You can buy a complete ball cock assembly if the old one is beyond repair.

FIXING WATER LEAKS SAVES WATER AND MONEY (Tape #225)

Leaky plumbing fixtures waste millions of gallons of good water in Florida each year.

A leak as small as 1/16 inch in diameter -- this would produce a very fine stream of water -- can waste almost 1,000 gallons of water in a 24-hour period. Such a leak might cost you $17.50 in just one week.

A 1/8 inch leak will waste 3,000 gallons of water in a 24-hour period. A pinhole leak -- one that oozes a drop per second will waste 170 gallons a day.

Leaky commodes are a frequent cause of wasted water. The commode that runs all the time is noisy and it may waste 500 gallons of water per day. Unfortunately, not all leaky commodes are noisy. Some of them have flapper valves that let water seep by them without making noise. One simple test to see if your flapper valve is fitting snugly is to add a few drops of food coloring to the water in the commode tank. If the water in the bowl changes color without your flushing the commode, then you have a leaky valve.

SAVING WATER IN THE KITCHEN (Tape #226)

There are many easy ways to reduce water use in the kitchen. Saving water can save money on both water and energy bills.

If you have a dishwasher, be sure to fill it to capacity before running it. The average dishwasher uses 13-16 gallons per 60 minute cycle. For most dishwashers, pre-rinsing isn't needed if you scrape the dishes before loading. A rubber spatula will do the best job of scraping.

Washing dishes by hand may or may not save water. If you wash dishes with the tap running you'll use 25-30 gallons of water. Washing and rinsing in a sink or dishpan with no running water requires only 5 gallons.

Simple changes in habits offer very easy and costless ways to reduce the water used in food preparation. Just turn the water off instead of letting it run while you are peeling and slicing foods such as vegetables. Take ice cube trays out of the freezer and let them sit a few minutes, instead of running water to loosen them.

You can reduce water use if you reduce the number of utensils used in preparing and serving food. Use only the amount of water necessary to cook foods such as frozen vegetables and stews. You'll preserve nutritional value as well as water.

SHOWER HEADS THAT SAVE WATER (Tape #227)

Three types of showerhead devices are readily available to help you save water. These are low flow showerheads, aerating showerheads and in-line flow restricting devices. Low flow showerheads and flow restricting devices reduce the amount of water that flows through the showerhead. Aerating showerheads mix air and water together, making it appear that more water is flowing through the shower than is actually the case.

The standard showerhead will deliver between 6 and 8 gallons of water per minute. The flow rate through most low flow and aerating heads is about 3 gallons per minute. Thus, either of these devices can cut in half the amount of water used in the shower. This could amount to a savings of as much as $130 per year for a family of four, when you consider both the reduced water bill and reduced energy required to heat this water.

Low flow showerheads and aerating showerheads are good investments for the family that wants to save energy.

A third device for saving water while showering is called a restrictor. This is simply a device that is placed in a standard showerhead or on the line to the shower. Restrictors, like low flow and aerating heads, can also cut water flow by as much as 50 percent. Generally, they are much cheaper than a low flow or aerating head, but some showerheads that are designed to deliver 6 gallons per minute may not work quite as well when the flow rate is cut in half.

Of course, a good way to save water in the shower is to take shorter showers. Another way is to take a "Navy Shower". For all you land-lovers who don't know what a navy shower is, you simply get in the shower, get wet, turn off the water, soap up, turn the water back on. rinse and get out. It is quick, doesn't use a lot of water, but it may not be a lot of fun. So, you may be more satisfied investing in a low flow or aerating showerhead.

TOILET CHANGES THAT SAVE WATER (Tape #228)

By making a few simple changes in your toilet or commode; you can easily save 10 to 15 gallons of water per day for each member of your family. Thus, if there are four members in your family, a savings of 50 gallons per day, or 1,500 gallons per month is possible.

This message will describe three changes that you can make in your toilet to save water. One thing that you can do is to put a plastic jug in the commode tank. Simply place about ½ inch of sand and gravel in the bottom of an empty milk jug and then finish filling it with water. Set the jug in the tank so that it will not interfere with the working parts of the commode. If you use a one-gallon jug, this means that your commode will use one gallon less water each time it is flushed. Do not use a brick which might cause corrosion of the metal parts of the flushing mechanism.

A second way to cut down on the water used by your commode is to use a dam. Dams are devices that you can but to prevent part of the water from leaving your commode tank. They are about the size of a large index card made of plastic or plastic-coated metal and have a soft, gasket-like edge. Dams may be installed in pairs, one on each side of the flapper valve. Or you can use a single dam. A pair of dams will cost between five and ten dollars and hold back about 2 gallons of water each time you flush the commode. A single dam will hold back 1 gallon of water.

Weights are another device that can save water. Flapper valves generally close when the entire commode tank is free of water. Once the flapper closes, the tank refills with five or six gallons of water. You can cause the flapper valve to close before all the water drains out by attaching a weight to the flapper. You can buy weights just for this purpose or you can make your own. One disadvantage of weights is the fact that you must hold the flush handle on your commode through the entire flush cycle to remove the solid waste.

SAVING WATER - TIPS TO SAVE ENERGY (Tape #229)

As much as one-fourth of the energy used in the average household goes for heating water. Therefore, anything that you can do to save water is going to help you cut down on your energy bill.

For example, it takes about a kilowatt of electricity to heat four gallons of water to a temperature of 140 degrees. Electricity in most parts of Florida costs over 4 cents per kilowatt hour. This means that it costs you at least 1 cent to heat a gallon of water.

You can cut your use of hot water through the installation of flow reducing showerheads, flow reducing faucet aerators and pressure reducing valves on waterlines. A little arithemetic will show the value of just one water - restricting device -- the flow reducing showerhead. A standard showerhead delivers about 6 gallons of water per minute. A flow reducing showerhead cuts this water in half -- to 3 gallons. By cutting your shower water in half, you could reduce your electricity bill as much as $30 per person per year, compared to the amount it would be without reducing hot water use.

LOWER WINDOW SHADES TO LOWER COOLING COSTS (Tape #230)

On hot summer days window shades block out around 63 percent of the sun's rays that can penetrate an unshaded window. This prevents interior heat buildup, so air conditioners don't have to work as hard to keep your home cool. This could save up to 21 cents of each dollar spent for home cooling. There are some helpful hints: when the sun is beating down, lower shades to block out the sun. This will help reduce the power drain during peak demand periods. During the evening, night and early morning, raise shades so cool air can enter.

FLORIDA'S AGRICULTURAL ENERGY USE (Tape #300)

Florida's agriculture is characterized by its diversity. It concentrates on fruits, vegetables and ornamental plants, dairy, beef, sugar cane, tobacco, poultry and forestry are also important.

In 1974 Florida agriculture used about five and a half percent of the state's total energy consumption. That same year Florida ranked tenth nationwide in energy consumption for agriculture. Florida uses more gasoline, diesel fuel, fuel oil and LP gas per acre for agricultural production than almost any other state. The fuel oil is mainly used for protection from cold weather. Diesel fuel is used for field operations and irrigation. Gasoline is used for field operations and vehicles. LP gas is used for irrigation and crop drying.

However, fertilizer represents one third of the energy used in crop production. Florida soils require seven times as much fertilizer per acre as the national average. Pesticide use by Florida agriculture is also among the highest in the nation. In fact, on a per acre basis Florida leads the nation in both total pesticide and insecticide use. It is indeed distrubing to realize how energy-dependent one of Florida's major lifelines is.

Energy use is not always easily seen. So here is an explanation of where all the energy goes.

Primary energy, such as crude oil, Natural Gas and Nuclear Power, is needed for inputs artificially supplied to agricultrual production systems. Only inputs supplied by nature, such as rainfall, sunlight and carbon dioxide do not require primary energy. The two kinds of inputs supplied by primary energy are called direct and indirect energy inputs. Direct energy inputs are easy to identify, they include gasoline, diesel fuel, electric power and LP Gas. Indirect energy inputs are more difficult to identify. Fertilizers, pesticides, machinery and building are a few examples of indirect energy inputs.

Now that we have identified the ways energy is used in agriculture we may ask, how well is energy used in agruculture?

There are several ways of measuring energy efficiency. One way is to figure out the energy ratio, for your crop. An energy ratio is a ratio of the food energy of the agricultural product to the sum of all direct and indirect energy needed for its production.

Energy intensity is another measure of energy efficiency. Energy intensity is the sum of all direct and indirect energy needed per unit area of crop production. Increased energy intensity often results in decreased energy productivity. Today it is very important for the agricultural producer to have a highly energy productive system.

Another measure of energy efficiency is your energy productivity. Energy productivity is the amount of an agricultural produce produced, divided by the sum of all direct and indirect energy required for its production. Energy productivity is used to compare different production systems for a specific crop.

A good way to increase you energy efficiency is to become an energy conservationist. Energy conservation simply means using less of an energy-requiring input or eliminating wasted input. Either practice can increase energy efficiency if production is not reduced. Energy conservation practices can be applied to all aspects of agrecultural production, from equipment purchasing to crop drying.

ENERGY SAVING FARM EQUIPMENT (Tape #301)

Energy conservation practices for Florida agriculture must consider power and machinery.

When you are buying equipment remember that replacing gasoline powered equipment with diesel powered equipment saves energy, diesel engines use only about 70 percent of the fuel of gasoline engines.

Try to buy fuel-efficient makes and models of powered equipment. This can result in savings up to 30 percent. To avoid energy waste match your tractor and implements. Also try to match the size of your equipment to your needs by choosing the smallest available tractor which can do the job.

Did you know that radial ply tractor tires can result in fuel savings of as much as 20 percent? Radial tires also save time in tillage operations because there is less wheel slippage, and radial tire life is greater.

Finally, watch for new energy-saving features on new equipment, such as instrumentation for monitoring fuel consumption continuously, electronic computer-controlled draft control and engine control and more efficient power train components.

ENERGY EFFICIENT EQUIPMENT MANAGEMENT (Tape #302)

For energy efficient equipment management, keep fuel use records. Knowing how much fuel each tractor uses for various operations helps you make fuel and dollar-conserving management decisions.

You can get significant fuel savings by deeping equipment properly tuned, adjusted, and lubricated, also keep tires properly inflated and cutting edges sharp.

Combine operation whenever possible. This will save a number of trips over the field and conserve both energy and money.

By laying out fields to avoid short runs and sharp turns, you can increase field efficiency and use less fuel to cover the same area. Another way to significantly reduce fuel use is to use a minimum tillage or no-tillage system of production. Minimum and no-tillage systems require a high level of management skill to keep high yields. So be cautious about adopting these systems and always get expert advice.

Timeliness of operations can also effect energy productivity. In particular, the timing of planting, harvesting, and pest control operations are especially important.

All of these things together will help you have a more energy efficient farm.

OPERATE YOUR EQUIPMENT THE ENERGY SAVING WAY (Tape #303)

When operating equipment, always use the optimum gear and speed. This will save you both fuel and wear on your equipment.

Try to eliminate unnecessary idling. An 80 horsepower gasoline tractor or a 145 horsepower diesel tractor will use about one-half gallon of fuel per hour while idling.

A well balanced and weighted tractor uses less fuel. The addition of the proper amounts and distribution of added weight to a tractor increases its fuel efficiency. Another benefit of adding weights to the tires is a decrease in wheel slippage.

Finally, whenever possible plow and disk your field at a reduced depth. Fuel needs vary directly with the depth to which the soil is worked.

Remember operating your equipment the energy saving way is also going to save you money.

KEEP YOUR CROPS WARM AND SAVE MONEY (Tape #304)

There are several ways to reduce frost protection energy requirements. Consider these ideas:

Use overhead sprinkler irrigation or wind manchines rather than heaters whenever possible. This will sharply reduce energy cost. Sprinkler irrigation uses the least amount of energy. Wind machines can be used with heaters. The combination uses less energy than heaters alone. Additional saving will result from using an electric motor rather than a gasoline engine powered wind machine.

Operate frost proptection equipment only at lower temperatures in order to protect only trees rather than fruit, or only fruit rather than leaves and twigs. Make use of all the newer temperature prediction services, such as satellite forecasting.

You may also delay blossoming of deciduous fruit crops by evaporative cooling with sprinkler irrigation.

All of these ideas can save you money, energy and possibly your crops.

ENERGY EFFICIENT FARM BUILDINGS (Tape #305)

Energy efficient farm buildings in Florida should be designed to be as cool as possible during the summer, and as warm as possible during the winter.

Here are some design suggestions which can help you build an energy efficient structure in Florida.

It is usually best to orient the building east-west. This means place the long axis of the building in a east-west direction.

Choose a building site with deciduous trees for natural shade. Deciduous trees will reduce heat loads on building in the summer and will barely affect solar heat loads on buildings in the winter.

Locate the buildings according to an overall plan. Remember buildings should never be closer than 40 feet to each other. If natural ventilation is important for this building, avoid buildings next to a thick stand of trees or underbrush.

Insulate building to proper standards. If the building is to heated and/or cooled, the walls should be insulated to a total R-value of about 11 and ceilings to about R-19 or R-24 in north Florida.

Use tight construction throughout the building. Be sure to caulk and seal all doors and windows. If the building is made of concrete block or some other type of masonry you should either paint or seal them with a silicone sealer. This will reduce air infiltration through the masonry construction.

Paint the outside of your building white. The white color will cut down on heat buildup inside the building.

Finally, keep all mechanical equipment in good working order. Check clean furnaces regualarly, keep air condtioners charged with refrigerant. Replace or clean air filters every 3 months. Keep all fans oiled, clean and free of dust.

Together all these ideas can help save your business a lot of needless expense and wasted energy.

CHOOSING ATTIC FANS AND VENTILATION SYSTEMS (Tape #400)

The most efficient type of natural attic ventilation is a combination of continuous overhang vents and a continuous ridge vent. The second most efficient type of natural attic ventilation is a combination of overhang vent and gable end vents. It is generally recommended that one square foot of free vent space be provided for every 150 square feet of attic floor space.

Additional attic ventilation may be added to a home in one of several ways. Additional overhang vents can be installed or larger gable vents can be added. Two other methods of providing additional attic ventilation are: The wind driven turbine vents and the thermostatically controlled roof-mounted or gable-mounted fans. To determine the size fan you'll need for your house, you'll need to consider the number of cubic feet in your attic and the number of air changes you want per hour. Most families figure 30 air changes an hour is enough. Now let's try some arithmetic. Just multiply the length of your attic by its width, then multiply by its height. This gives you the volume in cubic feet. The capacity of all fans is marked on the fan in CFM's -- that is cubic feet or air moved per minute. Multiply the volume of your attic by 30. Then divide your answer by 60. This gives you the CFM rating of the fan you'd need to change the air in your attic 30 times an hour.

RELATIVE HUMIDITY, COMFORT AND CONTROL (Tape #401)

Most people find a relative humidity level of 60 to 80% in the summertime, offers a maximum comfort level.

Decreasing the humidity level in your home lets you keep the temperature several degrees warmer while feeling just as comfortable as if the temperature was several degrees cooler. If you want to dehumidify a room in the summer, set the fan on your air conditioner at low cool, if you have this setting. This provides less cooling but more moisture removal.

In cases of 80 to 100% relative humidity it may be both necessary and economical to use a dehumidifier to help keep your home feeling cooler.

KEEPING YOUR CENTRAL AIR CONDITIONING SYSTEM EFFICIENT (Tape #402)

Do you use an air conditioner to cool your house? If you do, it could account for 26-27% of all the energy used in your home. Because air conditioning accounts for so much of your total energy use, it's a good idea to keep it working as efficiently as possible.

Here are some steps you can take to maintain the efficiency of your air conditioning system.

At least every three months syou should clean or replace the air filter. Have the condensor coils cleaned about every 5 years, by your serviceman. You should have a serviceman check oil bearings on the fan or compressor. The serviceman can also measure the electric current drawn by the compressor, check the pulley belt tension, check the electrical connections and finally check the refrigerant for leaks and add more if necessary.

There are three final things that can be done to keep your air conditioner efficient.

First, if your dampers have not been professionally set have this done. Secondly, remember to have your serviceman flush out the evaporator drain lines. Finally, keep your air conditioning unit free of obstructions, so that it has a good air supply.

HEATING SYSTEM MAINTENANCE (Tape #403)

Have your heating equipment serviced by a reputable heating specialist before the start of each heating season for efficient operation.

If your furnace is fired by oil or gas have the maintenance contractor clean the furnace and the outlets, check the belt for tension and wear, and make other adjustments or tests recommended in the owner's manual. Have an efficiency test made to make sure the furnace is operating at peak efficiency.

If you have a gas furnace, you'll need to have the pilot light checked for a clean, blue flame. Also have the sensing unit cleaned, and have the serviceman check nozzle size; older units can have the size reduced for more efficient operation. There are several things you can do to keep your furnace running efficiently. Check furnace filters, every two months during the heating season, clean or replace them as needed. Clean the fan blades annually. Keep the area around the furnace housing free of dust, lint and litter. Learn to recongnize trouble signals: odors, soot at the burner or black smoke rising from the chimney, indicate malfunction or improper adjustment. Get professional assistance. If one area of your home gets more heat than it needs, or if some rooms become hot before others are even warm, your heating system probably needs to be balanced. Have this done by a heating service specialist. Also inspect heating ducts annually for leaks. Repair them with a quality duct tape.

Heating ducts and water or steam pipes that pass through unheated areas such as attics, crawl spaces. and basements hsould be covered with duct insulation or unfaced insulating balls or blankets. If the ducts are used for air conditioning as well as heat, use faced duct insulation. Place the vapor barrier on the outside to prevent condensation on the duct.

Because they are integral parts of your heating system, registers and radiators also require special care and attention. Vacuum them regularly. Also have your service man adjust hot air registers, or the control louvers on hot-water baseboard systems, to satisfy your heating needs.

Last but not least, inspect chimneys, flues and flashing each fall for loose bricks and mortar, cracked linings and leaks. Have repairs made right away, by a professional.

TIPS FOR REDUCING AIR CONDITIONING COSTS (Tape #404)

If you have an air conditioned home in Florida, almost 26-27% of the energy which comes into your home is used for air conditioning. There are many things to consider when trying to cut your air conditioning costs.

One of the most important things to consider is the amount of insulation in your walls and attic. So be sure your house has enough insulation and is sealed with weather-stripping and caulking.

Here are some other steps you can take:

During the day close drapes and windows to prevent solar radiation from entering. When you are away from home for a day or more, turn off your air conditioner. However, if mildew is a problem you may want to install a timer on the air conditioner to run the unit for 2 hours each day, with the thermostat set at 78°, this will keep the relative humidity down. Use exhaust bath and kitchen fans sparingly, clean the air filters every three months.

If you use a window unit, use household fans to distribute the cool air and improve the performance of the unit. Aim air vents of room air conditioners upward for better air circulation. Also keep furniture, drapes and other things away from the vents. Finally if you are away from home every day, install a timer control to keep the air conditioner off until just before you get home.

USING SOLAR ENERGY TO HEAT SWIMMING POOLS (Tape #500)

Is solar pool heating feasible?

Yes! Many such systems are already in use in this country, generally, the initial cost of solar pool heating equipment is rather high in comparison with conventional equipment, particularly if the owner wishes to maintain a high pool temperature (80^0 to 85^0 F.) during the early spring months and late fall. If water temperature requirements are reduced, solar pool heating equipment costs can likewise be reduced. Solar equipment can also be used to augment existing pool heaters.

Most swimmers are comfortable at a pool temperature of about (80^0F). Even in Florida, conventional pool heating bills can be very high. Swimming pool heating is a good use of solar energy due to the low temperature required. To get a significant temperature rise with solar pool heating you will have to invest $3 - $5 per square foot of pool surface. This means you need a solar collector area about the same as the pool area.

What type of collector system should I use?

If a separate collector is used, it should either be of the draining type or otherwise able to withstand freezing. Even though the night temperature of the air may be 40^0F. or more, the collector could go below freezing due to the nocturnal radiation. A solar pool heater with a collector area equal to the pool area will raise the temperature 8 - 10^0F above normal. A typical pool requiring 400 $ft.^2$ of collectors would cost around $1,200-2,000. The cost of conventional pool heating all year in Miami is more than $2,000 without pool covers.

However, the amount of heating required can be cut in half by using pool covers an average of 22 hours a day. It is recommended that pool covers be used in conjunction with solar or conventional heating. Pool covers for an average pool cost about $250 (60¢/$ft^2$ installed) and last 2-3 years.

WHAT IS A SOLAR WATER HEATER? (Tape #501)

A solar water heater uses the sun's energy to heat water. This can reduce a person's monthly utility bill. Many thousands of solar water heaters were in use in the Miami area during the 1930's. Their use declined in the late 1950's due to lower power costs. They are becoming popular again as electricity and fuel prices rise. Solar water heaters save conventional fuel and are nonpolluting. If installed correctly they are usually economical over the life of the system for people now heating water with electricity or propane.

In the mild Florida climate most solar water heaters use a pump to circulate water from the water storage tank through one or more collectors and back into the tank. The circulating pump is regulated by an electronic controller which turns the pump on when there is enough solar energy to heat the water.

Collectors should be mounted on an unshaded area of a south-facing roof but can also be mounted on the ground. Collectors can face up to 45 degrees east or west or south without a noticeable decrease in performance. Collectors should be tilted at an angle about equal to the latitude (Florida latitudes vary between 25° (keys) and 31° (northern border), plus 10 degrees). A higher tilt angle will increase winter performance of the system. You may want to install the collector directly on to the roof slope, this will cause only a small decrease in efficieny.

SOLAR ENERGY FOR SPACE HEATING (Tape #502)

There are two basic types of solar space heating systems. Active and passive. Active systems are divided into liquid and air systems. They use pumps and pipes to carry heat from the collector to storage and from storage to the living area of the house.

Passive systems use the structure of the house to both collect and store energy. In the passive house, movable wall panels, shades, awnings, can be used to control the heat flow into the house. The passive system is normally used for new buildings. House orientation and landscaping play an important role in the passive system design. Due to the short heating season in Florida, active solar space heating systems are not economically feasible in the state and probably will not be in the near future, unless they can be combined with a solar cooling system. However, it is risky to install a solar heating system assuming that solar cooling can be added later since solar cooling systems of the future may not be compatible with your present system.

USING SOLAR ENERGY TO DRY GRAIN (Tape #503)

In Florida, humidity and ambient temperature are higher than in some other parts of the country. This is of particular importance for crops such as corn that are harvested during July and August, the hottest time of the year.

Florida conditions make grains very susceptible to spoilage if steps are not taken to dry the grain quickly. The safe holding time for grain is a function of both moisture content and temperature and amounts to only a few days for Florida harvest conditions. This is unfortunate with respect to solar drying because a short drying season, (a few weeks) means large collectors used only a small percentage of the time. Also, due to the special climatic conditions of the south, aflatoxin contamination of grain is of grave concern. The toxicity of aflatoxin is well documented in the literature.

Under conditions of high susceptibility to aflatoxin contamination special considerations have to be given to grain drying. Because of the risk of contamination, Florida producers should be careful about using solar grain drying systems that were designed for the midwest cornbelt.

There are some problems associated with solar grain drying, but in spite of these solar grain drying in Florida still shows some promise for the future. One of the attractive aspects of solar grain drying, is that thermal storage is not normally required. Also, the collector cost is low compared to other applications and locations because the best orientation of the collector for summer harvest conditions is flat on the ground. This simplifies construction and eliminates the need for insulation on the back of the collector.

The University of Florida's Agricultural Engineering Department has developed solar air heaters for grain and other crop drying. These collectors can be made from wood and plastic materials and are easy to build. Several designs have been tested. They mainly consist of black polyethylene film laid directly on the ground to absorb and transfer the heat and a layer of clear polyethylene film inflated over the black film. A blower is used to force air through the collector and keep it inflated. Greenhouse-type shade cloth suspended a few inches above the black film on the ground increased collection efficiencies about 30%. The lower temperature also increases the life of the plastic material.

Studies are being conducted at the University of Florida to determine the best management schemes for solar drying. Bin drying results in over-drying the bottom while the top layers remain wet. Stirring augers in the bins or some other type of mixing will be necessary for deep bin drying. Layer drying in bins or driers designed for shallow-bed drying may also offer some solutions to the problem. Preheating air to high temperature driers with solar may be feasible in some systems.

A complete economic anaylsis of solar crop drying for most application in Florida indicates that it is still not competitive with conventional fuels.

WHAT KIND OF A SOLAR COLLECTOR SHOULD I BUY? (Tape #504)

For solar domestic water heating, flat-plate collectors should be used. These are mounted in a fixed position throughout the year and do not track the sun. The frame of a flat plate collectoris a metal, wood or fiberglass box, 2-4 feet wide, 4 to 12 feet long, and 4 to 8 inches thick. It contains a black-painted absorber plate for absorbing the sun's energy. This energy is then transfered to water flowing through tubes soldered or bonded to the absorber plate. These tubes may also be an integral part of the plate.

To reduce heat losses, a collector must have insulation behind the absorbing plate and a transparent cover on the front facing the sun. Some edge insulation inside the box is also good.

Double cover plates are generally not economical in Florida. The best cover material is double-strength or tempered water-white glass of low iron content. Many collector manufacturers are using plastics rather than glass because they are less expensive. Plastic-covered collectors, however, are slightly less efficient and may need more to equal the heat production of those using glass.

The absorber plate is usually coated with a good grade of flat-black enamel paint. Some manufacturers have started using selective surface coating such as black chrome which performs better but whose durability and cost-effectiveness have not been completely proven.

The tubing in drinkable water heating collectors should be made of copper and should be at least one-half inch in diameter (inside) to reduce the effect of scale formation in the tubes.

HOW CAN I PROTECT MYSELF WHEN BUYING SOLAR ENERGY EQUIPMENT? (Tape #505)

In a relatively new and fast-growning field like solar energy, there may be a few dishonest firms. Ask the equipment salesman for a list of customers, and talk to them. Also, check into the firm's reputation. The contract with your installer is very important, because he is the man you will call first in case of trouble. Ask about the warranty offered and read it carefully, it is good to have a double warranty: one from the installer and one from the solar manufacturer.

Cost-effectiveness and reliability are prime concerns when buying solar collectors. Certification by the Florida solar energy center is required of all systems manufactured or sold in the state of Florida. Performance ratings are given by the FSEC. The rating "intermediate temperature", should be used to compare collectors for water heating application. But a certified collector supplying the most intermediate-temperature Btu per dollar of installed collector cost.

FSEC has also certified a number of complete solar water heating systems. The thermal performance of these systems was examined and found to meet or exceed a minimum standard of 50 percent of the hot water requirements of a family of four.

A list of manufacturers selling hud-approved systems may be obtained free of charge by writing the Hud office, FSEC

SELECTING A WINDOW AIR CONDITIONER (Tape #600)

The most important consideration in buying a window air conditioner is the Energy Efficiency Ratio, which is referred to as the EER. The higher the EER number, the less electricity the unit will use to cool the same amount of air. EER's will range between four and twelve. Avoid buying a unit with an EER of less than seven. You'll pay more for the units with higher EER's but the electricity savings will be worth it. A window unit with an EER of four, will cost almost three times as much to run as a unit with an EER of twelve

The Association of Home Appliance Manufacturers -- AHAM -- publishes a directory listing all certified window and through-the-wall air conditioning units, their capabilities and their EER's. The directory also lists the range of EER's available for a given capacity.

The AHAM directory is available at air conditioner dealers, so ask to see it before purchasing an air conditioner. If you know your room size, the directory has a simple procedure for determining how large an air conditioner you need. If you're midway between two sizes, get the smaller of the two. An air conditioner that's too big will shut off before it removes enough humidity from the air to make you comfortable.

Source: Teletip & NYIT - Energy Tips

DO MICROWAVE OVENS REALLY SAVE ENERGY? (Tape #601)

A microwave oven cooks food by using high frequency radio waves to generate heat.

The way of a microwave oven to make a significant energy savings is to use the microwave oven almost exclusively. A microwave oven does use less energy than regular ovens on comparable cooking tasks. But microwave ovens don't always save energy.

Remember, a microwave oven used only to reheat food probably saves little or no energy. However, when used to perform most cooking jobs, microwave ovens can save up to 50 percent of the energy used for cooking.

Source: NYIT, How to Operate an Energy Advisory Service, Vol II
Energy Information Handbook - IFAS, IV-3

WHAT TO LOOK FOR WHEN BUYING A MICROWAVE OVEN (Tape #502)

Usually, the cost of a microwave oven represents a sizeable investment for most people. But when used to its fullest extent, it can save time, effort and electricity.

Because of the generally high cost of a microwave oven you should be especially selective when buying your own microwave oven. There are several things you should consider before you buy your microwave oven.

First you need to decide what size microwave oven you want to buy. To do this you should consider the number of people who will be using your microwave or eating food prepared in it. Also consider how you plan to use it, and where you will put it.

Another very important consideration is what output wattage you need. The output wattage is a measure of the cooking power of a microwave oven. The lowest powered microwave oven you can buy is 450 watts. These microwave ovens have limited use. They usually cook food much slower than the larger units, and they usually have only one powersetting and no extra features.

Microwave ovens with a power range of 600 to 650 watts offer the greatest versatility and number of available features. One of these features is a temperature probe, which cooks food to a certain temperature rather than a set time. Another feature is the browning element. This feature is similar to the broiler element in electric ranges and is used after the food has been cooked to give the top of the food a browned look.

Microwave ovens come with a variety of control systems ranging from the simple mechanical on/off switch with a single power setting to electronic touch controls which can remember several power settings and cooking times. Remember, the simpler the control system, the less expensive the unit, the easier it is to learn how to operate and the more the unit costs, the more you have to do to get the cooking results you want.

One of the newest types of controls is the electronic solid state touch controls. They use computer technology to perform a number of functions. Most can be programmed to time cooking, and even recall a setting you previously made to cook a certain food. These controls are quite simple to use once the order of programming is learned and practiced.

The last three things to consider when shopping for a microwave oven are by no means the least important.

The first is the warranty or guarantee. Make sure you know what it says. Check to see how long the magnetron tube, which is the heart of the microwave oven, is guaranteed. The general expected life of a magnetron tube is 10 to 12 years of normal household use.

The second thing to consider is servicing. Microwave ovens usually require very little repair. However, sometimes, things do go wrong. So be sure to see what the conditions of the warranty say about servicing. Also consider the dealer from whom you buy the oven. A local, reputable dealer is more likely to provide good prompt service than someone from out of town.

The final consideration is cost, and it pays to shop around. Check with several dealers before you make a final decision. But remember there are other things to consider besides the lowest price.

BUYING ENERGY EFFICIENT APPLIANCES (Tape #603)

Did you know that appliances account for about 20-30 percent of all energy used in your home? So when you buy appliances always keep energy efficiency in mind. Ask yourself these questions when shopping for appliances. Do I really need this appliance? Is this an energy efficient appliance? Are optional energy-saving features available? Can I increase energy efficiency by cutting down on optional features?

Another thing you can do is to study appliance information in consumer information publications, which carry out independent tests on appliances. Finally remember to always compare warranties, features, energy usage estimates (when given) and price before buying any appliance.

Source: Energy Home Operator's Manual, Clark University; Science, Technology & Society Program. Fact Sheet #150

ENERGY CONSIDERATIONS WHEN BUYING A REFRIGERATOR (Tape #604)

Your refrigerator is one of the greatest energy consumers of all your home appliances. So you can see why it's important to get the most energy efficient model you can afford.

When shopping for a refrigerator there are many features available many of which decrease the energy efficiency of the refrigerator. For example frost-free models. But if you choose a manually defrosting refrigerator you must keep it free of frost build up. When frost builds up on a manually defrosting refrigerator, energy use can increase by as much as twenty-five percent.

Another feature to consider is the location of the freezer portion of your refrigerator. A side-by-side refrigerator-freezer uses more energy than standard models with the freezer on either the top or the bottom. So remember to consider all the features plus the price, warranty and service before buying your refrigerator.

Source: Energy Saver's Catalog by Editors of Conservers Guide
Energy Phone Operator's Manual, Clark University
Science, Technology and Society Program. Fact Sheet #511

FREEZERS - ARE THEY WORTH THE ENERGY? (Tape #605)

Is a freezer really a useful appliance for your family? To answer this question you must consider several things. Will a freezer save you money on your food bills? Did you know that freezing and storing food can add from 10 to 25 percent per pound to the original food cost? Therefore, a freezer is a good investment when most of the family's food is produced at home or bought at low prices, otherwise its major advantage is convenience. Also remember, that a well stocked freezer uses less energy than an almost empty freezer.

If you decide that a freezer is a wise investment for your family, here are some things to think about when shopping for a freezer.

Look at the appliance label for the annual operating cost. According to the rule of thumb for freezer size, you should allow two and one half cubic feet or freezer space for each member of your family. Don't forget to count the freezer space you have in your refrigerator.

Source: New York Institute of Technology Study "How to Operate an Energy Information Advisory Service" Vol. III

DISHWASHERS: SELECTION & EFFICIENCY (Tape #606)

The automatic dishwasher can be the most energy efficient way to wash dishes if these recommendations are followed. Always wash full loads of dishes. It takes the same amount of hot water for one dish as it does for a full load.

Most dishwashers require about 16 gallons of hot water for a complete dishwashing cycle. Washing the same number of dishes by hand uses more.

Be sure to use sufficient dishwasher detergent so that dishes don't have to be rewashed. If several days lapse between dishwasher loads, you may find it necessary to rinse off the dishes in cold water before loading them into the dishwasher.

Unless you need the dishes immediately, use the no-heat drying cycle or turn the dishwasher off after the final rinse. The dishes air-dry in several hours. You may want to leave the dishwasher door slightly ajar for faster drying.

If you're shopping for a new dishwasher, be sure to consider the energy-saving features now available. They include no heat drying cycles, shorter wash and rinse cycles, self-contained water heaters, delayed-start controls, and additional insulation to name a few. The energy-saving features will probably mean a higher purchasing price, but over the lifetime of the dishwasher, the energy savings probably will be worth it. Be sure to use the new energy labels to compare annual operating costs of similar dishwashers.

REFRIGERATOR EFFICIENCY (Tape #607)

The refrigerator, because it works round the clock, is the largest user of energy in the kitchen. If possible, locate it away from the heat sources such as the range, a furnace vent or a sunny window. Above all, keep the door closed as much as possible -- when you need to remove something from the refrigerator, remove it quickly. Encourage other family members to do likewise. Cool hot foods slightly before refrigerating them, but don't sacrifice food safety for a few cents of electricity. Keep the refrigerator at 38-40 degrees, the ideal temperature to keep food fresh and safe. Higher temperature causes quicker food spoilage, lower temperature wastes energy.

If the refrigerator or freezer has to be defrosted, be sure to do so before the ice gets over 1/4 inch thick. Ice acts as an insulator and causes the refrigerator/freezer work harder, thus using more energy.

If you are shopping for a new refrigerator or freezer, be sure to consider some of the energy-saving features now available. Higher quality foam insulation does a better insulating job than earlier fiberglass insulation. More efficient motors and condensers also use less energy. Defrost systems that automatically defrost the refrigerator when the frost builds up at a certain depth are more efficient than those that defrost every 8-12 hours. Be sure to use the new energy labels to compare annual operating costs of similar refrigerators. These labels can help you decide whether or not a higher priced energy efficient refrigerator will pay for the difference in lower energy costs.

EFFICIENT FREEZER USE SAVES ENERGY (Tape #608)

The electrical energy costs of home freezing are directly related, not only to the size and type of freezer, but to the turnover rate of stored items as well. The approximate freezing cost of one pound of food dramatically decreases with shorter storage times. In south Florida many crops are harvested twice a year, and some fruits and vegetagles become commonly available for even a longer period. It should be possible to have a complete turnover of all frozen food every six months. Be sure to use your freezer for foods that are most important to you. Produce, size, shape and density are important factors in determining electric energy expense. Would you believe it costs about 48 cents a year to store a frozen chicken. A chicken cost 4 times as much as a pint of fruit to store and a loaf of bread costs more than a chicken. Hoarding food in a freezer is poor economy. To make home freezing a worthwhile part of the energy dollar, families should select a freezer sized to fit their needs. Freeze only those foods the family will eat, and in amounts that can be enjoyed. Consider each food product individually and plan a rapid turnover of those foods most expensive to store. With these points in mind, even at today's prices, proper use of the freezer can reduce overall energy costs.

PLANTING FOR SHADE (Tape#700)

Planting trees and shrubs around your house will help reduce your cooling and heating costs. How much it will reduce your costs depends on the plants you choose and where you put them.

Trees and shrubs control solar radiation by shading people and buildings from the direct rays of the sun. Trees with full crowns are best for summer shading.

Trees provide the most shade when they are planted in groups beside your house.

Another effective way to shade your house is by planting deciduous vines on trellises. These are vines which loose their leaves during winter months. Vines provide direct shade, keep surface temperatures down and reduce heat gain caused by convection. Some added cooling comes from the evaporation of moisture from the leaves of the vine. Another thing to consider which is just as important as what kind of plants to use is where to put the plants.

If your house depends on natural cooling you should avoid dense plantings away from the house. This could cause a windbreak and keep cooling summer breezes away. Also, don't plant trees and shrubs close to the house. This will prevent a good flow of air around your house. If your house is cooled primarily by air conditioning the way you landscape will be quite different. Try to arrange plants so that they reduce air movement around your house. Also try and establish a windbreak which will block the summer winds.

Source: Energy Information Handbook by IFAS

SHADE TREE VARIETIES FOR SOUTH FLORIDA (Tape #701)

Planting trees around you home will help reduce your cooling and heating costs. How much you reduce your costs depends on your choice of plants and where you locate them. The best type of trees to use for shade are called deciduous. This means that in the winter they shed their leaves. Here are some varieties of shade trees that grow quite well in your area. The Jacaranda is a partically deciduous shade tree which has lovely blue flowers during the spring. The Gumbo Limbo is a native shade tree. It has an unusual open crown, and large limbs. This tree is a fast grower with few pests. Frangipani is another tree which is quite suited to your area. This tree is a fast grower with beautiful fragrant flowers. Royal Poinciana has long been considered one of the most beautiful flowering trees of the world. In addition to its beauty it provides good shade and grows quickly. An Earleaf Acacia is a handsome medium sized tree which can be used for shading. It is a very fast growing shade tree, which is well suited to your area. The Black Olive is a slow growing semi-deciduous tree, with a dense rounded compact crown and short, leathery leaves. A Mahogany is a native tree of South Florida. It is famous as a cabinet wood but also makes a nice yard tree. This is a semi-deciduous slow growing tree. Mango trees will porvide you with two kinds of benefits. Energy savings and a bonus of your own supply of delicate fruit.

VINES FOR SHADE IN SOUTH FLORIDA (Tape #702)

Vines attached to over head structures, such as arbors, will not only provide shade and cut down on solar penetration, but provide additional cooling through transporation from leaf surfaces.

There are many vines which are suitable for use in your area. Here are just a few. Bouganvilla is one of the favorites. Muscadine grape is another vine which yields both good shade and the bonus of fresh grapes. Another popular vine is the passion flower. This vine provides both excellent shade and lovely flowers.

Some of the more fragrant vines include Coral Honeysuckle, Confederate Jasmine, and Cape Honeysuckle. But no matter what type of vine you choose for your home, it will provide you with both shade and added beauty for years to come.

LOW MAINTENANCE LANDSCAPES (Tape #703)

Create your home landscape for leisurely enjoyment. The best time to begin planning a low-maintenence landscape is when the lot is chosen and before the house is built. However, most of us don't have a choice. We have to begin landscaping after the house is finished or work with an existing landscape. Even so, additions or changes in home landscapes can be planned so that every shrub, tree, and flower bed has a difinite purpose.

Here are some things to consider when planning a low maintenance landscape. First, consider the size. A small, well-kept garden is better than acres of weed. Reducing the size is often the simplest and most successful way to reduce landscape maintenance.

Simplicity is the watch word for good design and low maintenance. Eliminate as many frills such as bird baths, statues, and flower beds as possible.

Arrange plants carefully. Why not plant shrubs in masses? For example, an established dense shrub border needs little more than watering and prunings. Should you choose grass or ground cover? This choice is really a very easy one. Avoid planting grass in areas that are too shady, too dry or wet, or too steep to be mowed safely. Use a ground cover in these areas.

Mulches are another thing which can help you establish a low maintenance landscape. Use mulches around plants to cut down on weed growth and conserve moisture. Gravel, bark or pine straw mulches need little care beyond pulling or spraying the weeds that grow through.

Don't over fertilize. Plants kept at minimum fertilization levels need less pruning or mowing.

Edging will not only cut down on your landscaping work but it also makes your yard more attractive by defining the design more clearly. To futher reduce your yardwork and add beauty to your lawn is by building paths where foot traffic is heavy. Crushed stone or gravel make lovely durable road ways.

Would you like to have more privacy? A well-built wood fence serves as a property divider, gives privacy, and needs much less space than a planting of shrubs.

When planting flower beds remember narrow flower beds simplify weeding and spraying. Large masses of fewer varieties will provide bold colors with less upkeep. Also consider using native plants. Even with good planning, plants poorly suited to an area can ruin the appearance.

Finally, practice preventive maintenance. Anticipate problems before they occur. A preventive maintenance program decrease the time you spend working on your yard rather than relaxing in a well landscaped low maintenance yard.

WHAT IS GASOHOL? (Tape #800)

Gasohol is a blend of gasoline and 200 proof alcohol. Most gasohol is a blend of 10 percent, 200 proof ethyl alcohol and 90% unleaded gasoline. It can be used in automobiles, trucks, and farm machinery with gasoline burning engines, without major changes in the engine.

WHAT KIND OF ALCOHOL CAN BE USED AS FUEL (Tape #801)

There are two basic types of alcohol that have been used for internal combustion engines. The first is ethyl alcohol commonly called ethanol. This is produced by the fermentation of sugars. This is the alcohol of greatest interest today.

The second type is methly alcohol or methanol. This is commonly called "wood alcohol" - originally it was made from wood, but it can now be made from natural gas or coal. There are two other types of alcohols which are commonly called petroleum fuel additives or extenders. The second is butanol which is sometimes used as a diesel fuel additive or extender. It is often sold in little cans at the service station as a moisture absorbent for auto fuel systems. This is often called "dry gas".

Source: North Carolina Agriculture Extension Service, "Synergy"

HOW TO DENATURE ALCOHOL (Tape #802)

The process of making alcohol unsuitable for drinking is called denaturing. This is done by adding a substance to the alcohol that mixes with it and gives a bad taste or odor or both. This taste or odor is so bad that the alcohol is impossible to use as a drink.

Methyl (wood) alcohol and benzine are the denaturing agents authorized in the U.S. to 100 parts by volume of ethyl alcohol, (not less than 90% strength) add 10 parts of approved methyl (wood) alcohol and 1/2 of one part of approved benzine. Such alcohol is classed as completely denatured. Formulas for special denaturation may be submitted for approval by manufacturers to the

Regional Regulatory Administrator
Bureau of Alcohol, Tobacco, and Firearms
3835 Northeast Expressway
P.O. Box 2994
Atlanta, Gerogia 30301
Phone: (904) 455-2670

who will determine whether they may be used or not. Only one special denaturant will be authorized for the same class of insustries unless it is shown that there is good reason for additional special denaturants.

USE OF ETHANOL AS A FUEL (Tape #803)

Ethanol is being used as a fuel for internal combustion engines. Currently gasohol, a mixture of 10% anhydrous or water-free (200 proof) ethanol plus 90% unleaded gasoline, is available at a few service stations in Florida. Gasohol requires anhydrous, 200-proof, ethanol to prevent water from separating in the fuel tank. Most ethanol produced from small-scale distilling units will be only 160 to 190 proof which cannot be mixed with gasoline.

Both anhydrous and lower-proof ethanol can be burned directly in a spark-ignition engine without any gasoline. The main change required for successful performance is to increase the fuel jet opening diameter in the carburetor. About 1.8 gallons of 160-proof ethanol, or 1.5 gallons of 190 proof ethanol, is required to replace one gallon of gasoline, another required modification would be the addition of a small gasoline tank to allow starting on gasoline then switching to ethanol. It may be also advantageous to add fuel preheater.

THINGS TO CONSIDER BEFORE INVESTING IN ETHANOL PRODUCTION FACILITIES (Tape #804)

Before money is invested in facilities for ethanol production certain things must be considered and carefully weighted to determine the economic feasibility of the operation.

The first step is to determine the financial requirements and relate that to your individual situation.

Final requirements are detrmined by identifying capital costs, equity requirements, and operating cost. These requirement should then be compared to potential earnings. Capital requirements include the costs for:

- Real estate
- Equipment
- Business formation
- Installing equipment, and
- cost of licenses

Equity requirements are established by the financial lending institution if borrowed capital is used. Equity can be in the form of money in savings, stocks and bonds, equipment, real estate, etc.

Operating costs included:

- Labor
- Maintenance
- Taxes
- Energy (electricity & fuels)
- Bonding
- Mortgages
- Supplies (raw materials, additives, enzymes, yeast, water)
- Delivery expenses
- Insurance and interest on short term and long term financing.

Potential earnings are determined by estimating the sales price of ethanol/gallon and then multiplying by the number of gallons that the facility can sell as well as income that may be derived from the sale of co-products.

The organizational basis is the legal and business framework for the ethanol production facility. Broadly speaking, there are three principal kinds of business structures: Proprietorship, Partnership, and Corporation. It is best to consult a lawyer and/or accountant to determine which is best for your situation. After determining the organizational form, financing options can be looked at. Specific methods of financing for ethanol production plants can be divided into three general classes: Private financing, Public grants and loans, and Foundation. Private financing may be obtained from banks, savings and loan associations, credit unions, finance corporations, venture capital corporations, corporation stock issues and franchise arrangements.

Foundations provide funding either through grants or through direct participation by gaining equity, usually in the form of stock in the production company. Grants or loans are available from several federal agencies. Each of the agencies has operating procedures and regulations that define appropriate use of their funding. The availability of funds varies from year to year.

HOW DO I GET A LICENSE TO MAKE ALCOHOL? (Tape #805)

The Bureau of Alcohol, Tobacco and Firearms is the Federal Agency that issues licenses to manufacture alcohol. Since home production of alcohol for use as an alternative fuel is a new idea, the bureau can and will approve the setting up of experimental plants by individuals who are trying to prove the worth of this idea. There is no application form to fill out; just send in a letter with certain information stated in your own words to the Bureau of Alcohol, Tobacco and Firearms, P.O. Box 2994, Atlanta, Ga. 30301. The following information is required in this letter:

Nature and purpose of the alcohol producing plant: Give a general statement describing what you intend to do.

Description of plant premises: This means you should describe the location where you intend to establish the experimental plant. If you are a farmer, this should include you entire farm to let you use the alcohol you produce without removing it from your plant premises. Include in your description the number of acres involved. Also, describe the buildings used in the production and storage of alcohol and their relative location on your farm.

Description of production process and equipment: Describe the production process you plan to use. Then give a description and list of the equipment used in the process. Describe when and how you plan to denature (make unfit for drinking) the alcohol produced. Also, tell the Bureau what you intend to do with the by-products (cattlefeed, fertilizer, etc.)

Security: Tell the Bureau what security measures will be provided for the alcohol produced.

Rate of reduction: State in gallons the amount of alcohol you expect to produce in a 15 day period. Tell the Bureau the average proof of the unfinished alcohol produced.

Duration of proposed operations: Tell the Bureau how long you want to operate the experimental distilled spirits plant (not to exceed 2 years).

Before beginning operations, the Bureau suggests you contact your state and local authorities for their requirements relating to the production and use of alcohol for experimental purposes.

HOME BUILDING THE ENERGY SAVERS WAY (Tape #900)

You can almost always avoid energy-wasting mistakes when building a house if you just consider a few things before you begin construction. The first things you should consider are climate, local building codes, and most of all energy-efficient construction. Some more specific things to consider include:

* The floor plan can have a big effect on the energy efficiency of your home.
* Be sure to insulate walls, roof and floor sufficiently.
* If the base of the house is exposed build a "skirt" around it.
* Think about solar heat gain when you plan your window locations.
* Install windows you can open so you can use natural ventilation whenever possible.
* Finally remember in a warm climate light colored roofing can help keep houses cooler.

Source: Tips for Energy Savers by USDOE

BUYING A HOME .... BE ENERGY CONSCIOUS. (Tape #901)

When you buy a home, you don't want to buy someone else's energy wasting mistakes. So, before you buy a home, consider everything about it as if you were going to build that home yourself. Ask yourself three basic questions about each home you look at:

1. Did the builder consider the climate when the house was built?
2. Did the builder conform to local building codes?
3. Does this home have a very energy-efficient construction?

After you are satisfied with the answers to these questions, carefully examine the house, always looking for energy wasting characteristics. Here are a few things you might want to consider next time you look at a home you are thinking of buying:

1. Ask for a description of the insulation and the efficiency of space heating, air conditioning and water heating equipment.
2. Look at the floor plan.
3. What type of attic ventilation system does it have? Check the overhang or eve area.
4. Check on window location and house orientation. Can the windows be opened so that you can take advantage of natural wind currents?
5. Finally consider the need for additional insulation or replacement of equipment.

HOW DO I FINANCE AN ALTERNATIVE ENERGY OPERATION? (Tape #902)

Financing for alternative energy costs can be divided into 3 general categories: private, public grants and loans, and foundations.

Private financing may be obtained from banks, savings and loan associations, credit unions, finance corporations, venture capital corporations, corporation stock issues and franchise arrangements.

Foundations provide funding either through grants or through direct participation by gaining equity. This is usually in the form of stocks in the production company.

Grants or loans are available from several federal agencies. Each of the agencies has operating procedures and regulations that define appropriate use of their funding. Funding amounts vary from year to year. Some of the federal agencies making grants or loans available are the USDA's Farmer's Home Administration, The U.S. Housing and Urban Development's small business administration, the Department of Commerce's Economic Development Administration, and the Department of Energy.

WAYS TO SAVE ENERGY IN YOUR RESTAURANT (Tape #903)

In a typical Florida restaurant 64 percent of the total energy used is electricity and 36 percent is natural gas. If you own a table restaurant you used about 45 percent of the energy needed by your business in the preparation of food. Another 32 percent goes into heating, cooking, and ventilation. That is a considerable amount of energy and one of your biggest expenses.

Here are a few ideas on how to reduce your energy use and your expenses.

Determine a schedule of preheating times for ovens, steam tables, grills, broilers and fry vats. Usually 10 to 30 minutes is long enough. Use a second fry unit, boiler or oven only during peak business hours. When preheating the ovens, set the thermostat at the desired temperature. If you set the dial higher it will not preheat faster, it will only waste energy and cost you money. Make sure your oven thermostats are properly calibrated to assure correct cooking temperature and maximum efficiency.

Use smaller or more energy efficient ovens when possible. Did you know that every second an oven is open it loses about 1% of its heat. Load and unload ovens as quickly as is safely possible.

Cook meat slowly at low temperatures. It takes about 25 to 50 percent less energy to cook a roast for 5 hours at 250 degrees F. than it would to cook a roast for 3 hours at 350°F. Always try to schedule baking or roasting so that ovens are used to their fullest capacity, this will reduce the operating time for your equipment.

Did you know that wrapping potatoes in aluminum foil increases their baking time? If you must wrap potatoes in foil do it after they are baked.

By using these energy saving ideas you can cut your energy bills which helps you save on restaurant expenses.

DRESS TO KEEP COOL (Tape #904)

The clothing you wear directly affects your comfort and efficiency both on the job and at leisure time.

Clothing plays a role in the heat transfer between the body and the environment. Clothing also plays a role in the heat exchange process, because if moisture is absorbed without wetting the surface of the fabric, the fabric will feel more comfortable. Some absorbent fibers include wool, cotton, linen, rayon, and silk. Most man made fibers are not absorbent. They have a tendency to take up moisture through a process called wicking. Fibers which tend to take up moisture wicking are acetate, acrylic, nylon polyester and triacetate. Linen is the only natural fiber which has a tendency to wick, as well as absorb.

Fibers which absorb moisture will keep you more cool and comfortable than those which wick.

Another consideration is the weave and weight of the fabric. Usually open weave fabric is cooler than closed weave fabrics. A light-weight fabric allows body heat to escape.

Some cool choices in new man-made include Visa ^{R} and Zelcon^{R}, which have a special finish which makes them absorbent and cool. Also, choose fabrics that are open weave or open knit fabrics such as lacy knit, eyelet and chambray.

If you choose white and light colors you could reduce body heat gain by as much as 50%. Also remember that cool blues and greens can make you feel cooler psychologically. When buying clothes remember loose clothes are cooler than tighter fitting ones because they let the air circulate between the skin and clothes.

Don't layer clother during warm months. Air will be trapped next to your body, acting like an insulator.

Skirts or loose fitting dresses are cooler than slacks. Sleeveless dresses will allow more ventilation. Also women should wear half slips instead of full slips whenever possible.

For men choose unlined, light-weight jackets for coolness. Also wear light-weight trousers, these are truousers that you can see through when you hold them up to the light. Remember that short sleeved shirts are cooler than long sleeved ones.

Be sure to wear protective headgear. Direct sunlight on the head causes the body to overheat.

Finally remember clean clothing is cooler than soiled clothing body oils and dirt coat the fiber and prevent ventilation.

By using these tips you can have a cooler more enjoyable summer.

HOW TO CHOOSE A SERVICE DEALERSHIP (Tape #905)

There are many services related to keeping your home and equipment energy efficient, which should be performed by a trained professional.

When the time arrives and you need the services only a professional can offer, be sure you get the most reliable service and honest prices available in your area.

Before you have any service personnel do any work for you here are a few things you can do to make sure that you get the best service for your money.

One of the most important steps you can take is to always get more than one price quotation every time you need to have work done. Get quotations on the cost of supplies and how much they charge per hour for labor.

You can also check with the Chamber of Commerce or Better Business Bureau for a listing of reputable service dealerships in your area.

When talking with service dealerships make sure that their service personnel are properly certified. Question dealerships about what kind of guaranties they give on their work.

It is also a good idea to check with the dealer you originally purchased your equipment from and see who they suggest for servicing.

Finally, talk with people you know who have had simple work done. Ask them who did the work and how satisfied they were with both the work and with the price.

If you follow these suggestions when selecting a service and repair dealership you will most likely end up a satisfied consumer.

APPENDIX 5

Extension Energy Tips Survey

EXTENSION ENERGY TIPS SURVEY

All of your responses will be treated confidentially. Your name is not required. We have numbered your survey form only to keep track or the number of surveys distributed, but not returned.

1. How did you first hear about the Extension Energy Tips Service?

___Radio
___Television
___Newspaper
___Extension Personnel
___Brochure
___Poster
___Friend
___Other(please specify)_____.

2. How many times did you use the Extension Energy Tips service? _____

3. Would you use the Extension Energy Tips service again? ___Yes ___No

4. Have you ever used another telephone-taped information service? ___Yes ___No

5. Why did you use the Extension Energy Tips serivce?

____Curious
____Had a specific problem
____Wanted General Information
____Other(please specify)_____.

6. Did the information in the taped message answer your question? ___Yes ___No

7. Did you have any trouble understanding the taped message? ___Yes ___No

REGARDING THE EXTENSION ENERGY TIPS SYSTEM:	VERY	SOMEWHAT	NOT
8. How satisfied are you with the service you received?	____	____	____
9. How useful did you find the information you received?	____	____	____
10. How easy to apply was the information you received?	____	____	____

11. Do you think that the Extension Energy Tips service is a practical way to get energy information? ___Yes ___No

12. Did you find the length of the taped messages to be:

____Too Long ____Too Short ____About the right length.

13. Which of the following ways would you prefer using to get energy information?

____Visiting the Sarasota County Extension Office.
____Calling the Extension Energy Tips service.
____Talking with an Extension Agent on the telephone.
____Other(please specify)_____.

14. Do you think that using the Extension Energy Tips service changed your general attitude toward energy issues? ___Yes ___No

	VERY SERIOUS	FAIRLY SERIOUS	NOT AT ALL SERIOUS
15. How serious would you say the energy situation is NOW in the United States?	___	___	___
16. How serious would you say the energy situation WILL BE in this country in the next five years?	___	___	___

17. Did you change your surroundings or lifestyle as a result of the information you received from the Extension Energy Tips service? ___Yes ___No

18. If you answered YES to question 17, what kind of energy saving practices or devices did you use? Please list your actions below:

1._____ 3._____
2._____ 4._____

19. Please estimate how much money you spent on energy saving devices over the last four months. $_____

20. If you have not spent any money on energy saving devices, do you plan to within the next six months to one year?

___Yes, could you estimate how much you PLAN to spend. $_____
___No, I do not plan to spend any money on energy saving devices.

22. Would you like to see the Extension services taped message system expanded to include information on other topics? ___Yes ___No

23. Please check ALL of the following agencies or people you have had any contact with:

___The Sarasota County Cooperative Extension Service.
___The Extension Service
___County Agent
___Extension Agent
___Home Economist
___Energy Agent
___Home Economics Agent
___Livestock Agent
___4-H Agent
___Ornamental Horticulture Agent

24. What is your age?_____years.

25. What is your sex? ___Female ___Male

26. What is your race?

___White
___Spanish-American
___Black
___Other(please specify)_____.

27. What type of housing do you live in ?

___Single Family Home
___Condominium
___Apartment or Duplex
___Mobile Home

28. What was your approximate family income before taxes last year, 1980?

___Under $5,000
___$5,001 to $6,999
___$7,000 to $8,999
___$9,000 to $11,999
___$12,000 to $14,999
___$15,000 to $19,999
___$20,000 to $24,999
___$25,000 or more.

29. How far did you go in school?

___Never went to school
___Some grade school
___Completed 8th grade
___Some high school
___Completed high school or equivalent
___Completed college(4years)
___Graduate or Professional school

30. Are you presently (check all that apply):

___Full time student
___Full time homemaker
___Retired
___Disabled
___Employed full time
___Employed part-time only
___Unemployed
___Self-employed

31. Where do you live?

___On a farm
___In the country, but not on a farm.
___In a town of under 2,500 people.
___In a city of 2,501 to 10,000 people
___In a city of 19,001 to 50,000 people
___In a city larger than 50,000 people

APPENDIX 6

General Public Telephone Survey

General Public Telephone Survey

Hello, I am calling with the Sarasota County Cooperative Extension Service, you might know it better as the Ag Department. We would like to ask you a few questions about energy:

1. Are you interested in saving money on energy costs?

   _____ Yes (Y) _____ No (N)

2. Are you aware of the Extension Energy Tips program offered by the Sarasota County Cooperative Extension service?

   _____ Yes (Y) _____ No (N)

3. Have you ever used the service?

   _____ Yes (Y) _____ No (N)

4. If you knew about such a service would you use it?

   _____(Yes) _____ No (N)

5. How serious do you think the energy situation is <u>now</u> in the United States?

   A. _____VERY SERIOUS B. _____SERIOUS C. _____NOT AT ALL SERIOUS

6. How serious do you think the U.S. energy situation will be in the next 5 years?

   A. _____VERY SERIOUS B. _____SERIOUS C. _____NOT AT ALL SERIOUS

APPENDIX 7
Cover Letters

FLORIDA COOPERATIVE EXTENSION SERVICE
UNIVERSITY OF FLORIDA
INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES

COOPERATIVE EXTENSION SERVICE
SCHOOL OF FOREST RESOURCES AND CONSERVATION
AGRICULTURAL EXPERIMENT STATION
COLLEGE OF AGRICULTURE

REPLY TO: 2900 Ringling Blvd.
Sarasota, Fla. 33577
March 5, 1991

Dear Sarasota County Resident:

The Florida Cooperative Extension Service for Sarasota County recently installed an "Energy Tips" system as a part of it's "Library on Tape"! I understand you have used the Extension Energy Tips and I would appreciate YOUR opinion of the service and information you received. Your opinion will assist me in evaluating and improving the system and its taped message.

Ms. Cindy Sheffield, project manager at the Ag & Extension Ed. Dept. of the University of Florida who researched and wrote the taped messages. As well as helped us publicize this system is presently evaluating the program with us.

Please take a few minutes of your time by completing the enclosed survey and returning it in the self addressed envelope. No postage is needed.

Respectfully,

L. L. Rozar, Jr.
County Extension Director III

LLR/jbw

encl. Energy Survey
Wm. Farrington
Self addressed envelope

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UNIVERSITY OF FLORIDA

INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES

GAINESVILLE, FLORIDA 32611

DEPARTMENT OF AGRICULTURAL
AND EXTENSION EDUCATION

305 ROLFS HALL

PHONE: 904/392-0502

Dear Extension Energy Tips User:

Thank you for using our taped message system.

We need your help in evaluating the Extension Energy Tips system. In order to evaluate this system we need to know how you feel about the service you received.

Since you have used the Extension Energy Tips system, your opinions are important to us. We are asking you to let your thoughts and feelings be known. Will you please take a few minutes of your time to share your opinions by completing the enclosed survey form? Your responses will be held in the strictest confidence.

We have numbered the survey form only to keep track of the number of surveys distributed, but not returned. An addressed stamped envelope has been enclosed for your convenience. It is important that you try to return this survey within this week.

Sincerely,

Wm. S. Farrington

William s. Farrington
Associate Professor

WsF/rf

COLLEGE OF AGRICULTURE · AGRICULTURAL EXPERIMENT STATIONS · COOPERATIVE EXTENSION SERVICE
SCHOOL OF FOREST RESOURCES AND CONSERVATION · CENTER FOR TROPICAL AGRICULTURE

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